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A Monthly Review of Veterinary Science.

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HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING
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CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MÉDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor:

GLADSTONE MAYALL, M.R.C.V.S.

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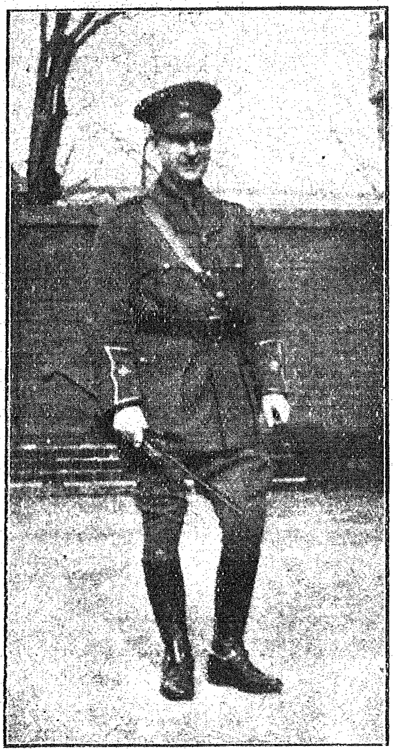

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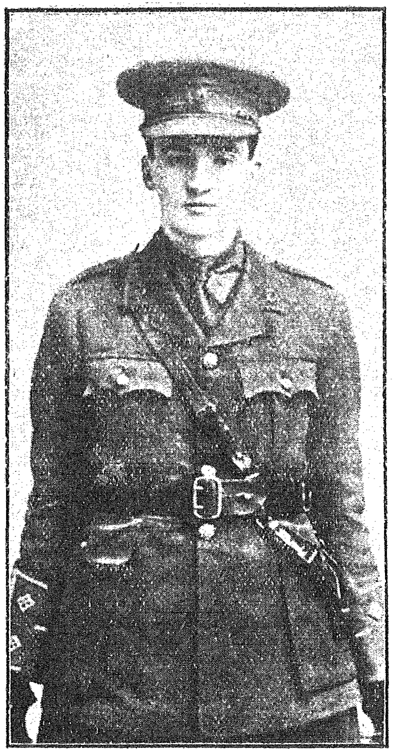

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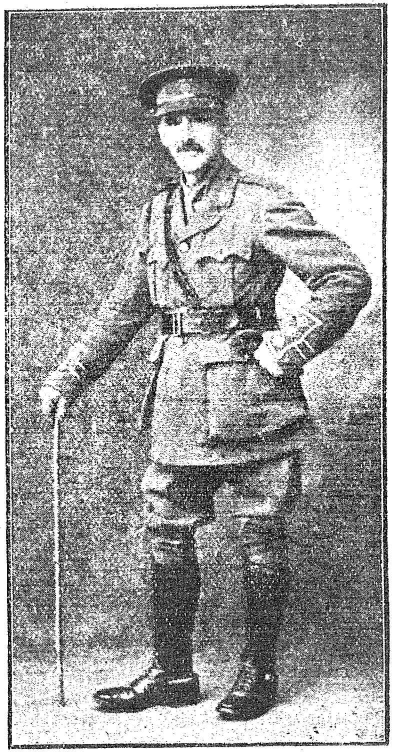

THE LATE CAPT. JAMES SHIRLEY, A.V.C.

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Editorials.

ENERGY AND PRODUCTION.

THERE are many calls on all sides for the putting forth of effort in connection with the War. The greatest call of all is for a display of energy in matters of production. There is great need, too, to look at works that create necessities in the right perspective. Control has its place in well-ordered operations that enable the vast majority to live, but to make a fetish of control and to neglect energetic and enthusiastic measures to increase the supply of all commodities is like making a race of schoolmasters without paying any attention to the production of the boys and girls that form the school. At present we think there is far too much talk about control and far too little thought and energy devoted to the production of controllable things. Facts like the scarcity and lack of foodstuffs and of farm and back-yard animals are accepted with a foolish fatalism that considers them as irremovable and irremediable.

Then, again, it seems evident that there is far more would-be energy anxious to distribute food than to produce it. It may be that the food producer does not advertise his activities as much as the distributor, but after a number of years' experience of men and their ways, we have always found those who want the finished article to be greatly in excess of those who want to set about giving time, thought, and effort to the gradual production of the animal or thing desired and wanted. Men want milch cattle ready-made to milk them; they don't want to bother about rearing calves. They want pork and bacon, but not to keep pigs; they need fowls, potatoes, cabbages, and fruit ready for cooking and eating; but the effort needed to produce them is a job for the other fellow. "Back to the land" is a basic and fundamental cry for the country and nation that desires to really live. The range of food products is inclined to be too narrow. Recently the Editor called attention to the value of horse flesh as food. It was a wise thought. More might be done with regard to goat flesh, venison, pigeons, wild birds, tame rabbits, frogs and fresh water fish. Co-operative effort needs extending in these directions, and a closer union forming between rural districts and man-made towns and cities.

Veterinary surgeons should do all that lies in their power to encourage the breeding of small animals useful as food. The man who loves to dabble in the nursing and bringing up of young animal and vegetable life even on a small scale is worthy of encouragement, support, and praise. The support in a well-ordered State ought to be practical, scientific, and plentiful. A well-known statesman recently said that the allotment holder chiefly saved us from famine in 1917. There are about 1,000,000 allotments in England and Wales at the present time. There would not be too many if the number was doubled or trebled. On all hands the cry is for brains and effort, and still more brains and effort. In many circles at present the position seems to be that described in the Lancashire saying: "Hello! has tha pulled thi coat off to make folk think that tha'rt working?" The head wants to work with the hands. G. M.

SAVING ANIMAL LIFE.

THE veterinary surgeon's mission is to preserve animal life and not to destroy it. At the present time it is equally important to conserve the flocks and herds at home as to save as many as may be of the animals on campaign. It is a credit to the Army Veterinary Service that there has as yet been no great outbreak of serious contagious disease. The plagues that have hitherto followed in the wake of great armies are conspicuous by their absence. Rinderpest, anæmia, foot and mouth disease, up to date seem all to have succumbed to efficient and painstaking veterinary measures. It is estimated that about 4½ million horses and mules are being employed by the various nations at war, and in this vast assembly there seems to be very little serious contagious and infectious disease.

We have always thought that the veterinarian who succeeds in bringing his horses and mules in good health to the scene of warlike operations is deserving of special praise and commendation. Good hygiene, which prevents exposure to heat, cold and wet, clean and roomy quarters, avoidance of over fatigue, cars and stalls with sufficient air space, all involve an amount of care and anxiety on the part of the veterinarian which puts a much greater strain on him than if he was engaged in the equally important duty of seeing that the anmals were sound and healthy when bought. The saving of horse life in the missile-swept zones may possibly be furthered by paying more attention to the gentle art of camouflage. This is one of the up-to-date moves of the War. "Camouflage" has been existent among us for many a long year, but it has only just been prominently recognised. There is commercial, professional, dress, writing, statistical, and oratorical camouflage, and it seems as though it might be possible to make the colour of horses harmonise with the ground or to make them appear what they are not in reality.

If the preservation of animal life is well organised and well carried out in the combatant areas the same is quite as important in the areas from which supply is derived. It will not do for us to sit down and say "Everything is for the best in the best of all possible worlds, and with folded hands we'll watch developments." Cattle, sheep, pigs and goats are being reduced in number. Do we know nothing of the operations necessary to renew the supply? The times are difficult, but difficulties exist to be overcome, and the Britisher has in the past had a good record in the surmounting of them. The responsibilities of veterinary surgeons remaining in civil life are increased rather than lessened as regards the preservation of animal life. We must give to the service of the live-stock industry the best that is in us. The man who now sees to it that two food animals grow and thrive where one grew and thrived before is a supreme patriot who is helping to establish the nation on a rock.

G. M.

Original Communications.

DISTOMATOSIS, LIVER-ROT OR FLUKE IN SHEEP AND CATTLE.

By EDWARD MORGAN, M.R.C.V.S., D.V.H.,
Puerto Cabello, Venezuela.

ALSO, locally, is known better by other terms: Pwd and Cwalo (Wales); Coathe (Dorsetshire, Devon); Iles (Cornwall); Bane (Somersetshire); Cachexie aqueuse (France).

A few years ago Professor Dewar called attention to the fact that ethereal extract of male shield-fern had been used with success in France in the treatment of the above disease in sheep. Up to that time treatment in the way of medicine was considered of little value for destroying or getting rid of the parasites from the liver.

The following month of January I had an opportunity amongst our own flock of testing such efficiency of the drug.

Subjects.—Two Welsh mountain rams four years old. These animals showed symptoms of being badly affected with the parasites:—Emaciated, and so weak that sometimes when they would get in amongst the heather, they had to be assisted out. Impaired appetite; the visible mucous membranes were pallid, and with a tinge of yellow; œdematous eyelids. The wool could easily be separated from the pelt. Abdomen pendulous and distended. Thirst. Prominent œdematous swelling between the rami of the lower jaws, which farmers in some districts term as "chockered" and "watery poke," and which they considered as the spot of all the evil. (They incise it, then squeeze the contents, and afterwards plug it with some special variety of herbs, and at the same time decorate the sheep with a collar round the neck made of fine twigs of mountain ash.) These two sheep voided fluke eggs with the fæces. They passed most of their time grazing on ditches and damp areas where the grass is soft and evergreen.

Treatment.—I placed these two sheep in the stackyard, where they could take corn, hay, and swedes *ad lib.* Each received daily 2 drachms of ethereal extract of male shield-fern, mixed in an ounce of linseed oil. This medicine was continued with for one week, *i.e.*, once a day. They had two more doses about the end of the second week. They stayed in the stackyard for about six weeks, until one day they felt strong enough to jump the fence and join the rest of the flock; and later in the spring they left the fields once again and took to their old haunts on the highest peaks of the hill.

In August of the same year we killed one of the two, which was in good, fat condition. I examined the liver, but found no flukes, but cirrhosis of the organ, and thickening of the walls of the bile-ducts.

Having seen that this one was free of flukes, we then decided to keep the other sheep. In the autumn he was placed in some fields with about sixty ewes, all of which in the spring dropped strong, healthy lambs. Again the next season he was allowed to run with the same number of ewes in the same fields, but unfortunately one or two of these ewes, which were bought in September, died during the winter months. Evidently they were "coathed"—*i.e.*, had flukes in the liver at the time of sale, as several ewes from the same flock died elsewhere.

The following summer, after we had already seen that these ewes were infected, and that the ram had been in contact with them and had been on the contaminated pasture throughout the winter and spring, we thought that the best way this time was not to spare the knife, as the ram was in good condition. On examination of the liver, I found it indurated with extensive proliferation of the connective tissue, and there were a few flukes present, as anticipated, but not so numerous as I have witnessed in apparently healthy sheep which have been slaughtered elsewhere at different abattoirs. I should account for the presence of these flukes by the contamination of the pasture by the before-mentioned ewes, and that this ram if allowed to run its course for another season, would most probably succumb. Also, if it had been killed the previous summer, I would have found the liver free of flukes.

Judging, then, by the favourable results of the above two cases, ethereal extract of male shield-fern, if used early, before the grave symptoms appear, should give good results, as the above two cases were in the last stages of the disease when treatment was commenced, but being rams they could withstand it longer than ewes. That is my experience.

When treating such cases it is most essential to allow the sheep plenty of nutrient dry food and place them on pasture free of ditches and "sheep-rot weed," or else they will be continually dawdling around such places and nibbling the soft, green grass, which nature never provided for sheep, but for aquatic and semi-aquatic birds, and such areas are the homes of the fresh-water snails and the heaven of wild ducks, snipe, woodcock, etc., which devour snails and embryonic flukes such as the encysted cercaria which are attached to this grass.

It is remarkable that even the presence of a large number of liver flukes does not ordinarily cause any disturbance in the nutrition of cattle. I have noticed that sometimes only a small area of the liver is unaffected, and yet the cattle which have been slaughtered were in good nutrient condition. Often the carcases are as good as any in the abattoir. We know that flukes are far more prevalent in sheep than in cattle in Great Britain, owing, to a certain extent, to the cattle being stall-fed in winter, and if there are any flukes in their livers they void many of them during the winter, and are not re-infected, and many of the eggs are unable to go through the usual life cycle, being probably destroyed unless the manure is carted away soon to damp pasture; but in most districts the manure is carted to arable land. In the case of sheep they are on the pasture all the year round, and once infested with flukes, are often re-infected by the embryos from the eggs which they have discharged on the land; as it only takes about three weeks after the encysted cercaria is swallowed before the fluke is fully mature in the liver.

Apart from the medicinal treatment, is there such an occurrence as spontaneous recovery—getting rid of flukes from the liver? In the case of cattle I believe it often happens so.

At the Frigorifico of Venezuela, in the spring months of the year, on an average between 50 and 100 per cent. of the livers of cattle contain flukes in great numbers as well as gall stones; the presence of the latter are due to a certain extent to the presence of the flukes. Last year a herd of bullocks about six years old were slaughtered one day in the abattoir at Puerto Cabello. All the livers contained flukes in abundance, so much so that the bile ducts were distended like varicose veins, and most of them contained calcareous deposits and gall stones in the bile ducts and gall bladders. Two bullocks of this same lot of cattle were not fit to be slaughtered, being emaciated. I ordered them to be sent to some pasture adjoining the sea, where salt percolates through the soil on to the surface, the land being almost of sea level. These two bullocks made a quick recovery out there, and were slaughtered about three months ago, being in fat condition, for beef purposes. They remained on this land for about eight months. On *post-mortem* examination I found the livers free of flukes. One liver was enlarged and yellowish in colour—fatty infiltration—and indurated round the borders. The other liver had an area of induration at the inferior third of the posterior surface, and the presence of dark, pitted areas—cavernous blood spaces—on the surface, which extended into the liver substance. These are only two out of many such cases which I have witnessed. We meet these fluky livers in the spring months of the year, in the majority of cases. Many of these bullocks which they are unable to slaughter in the spring are kept on until the autumn, and bullocks from the same herd of cattle and from the same pasture, which were killed in the spring, were infected with flukes, and the rest, which were kept on until the autumn, were found free of flukes at the time of slaughtering.

I think our knowledge of this parasite is not yet what one would desire. There might be certain months of the year when there is a certain stage in the life cycle of the parasite or its intermediate host which is yet unknown. The parasite might be less vigorous during certain months of the year. Why is it that in the tropics of Venezuela the parasites are so prevalent in the livers during the spring months of the year, and during the other months rarely a fluke is seen? We might think that in temperate zones the difference of temperature between summer and winter would account for such occurrence, but here the temperature is about the same throughout the year, therefore there must be some other cause for their absence at certain months of the year.

Given a suitable ground, such as moisture, etc., these parasites are most prolific, as almost everything seems to be in their favour for multiplying. Being hermaphrodite, one parasite is sufficient in a short time to contaminate an extensive area of land. Distomes are pure entozoa. They cannot live in the adult condition outside the body of their definite host. Their embryonic stages are passed partly in smaller host animals of the group of molluscs, mostly water snails of the genus limnœa. Cases have been recorded in Great Britain in the horse, man and pig, but they are most prevalent in sheep and cattle in most countries. In Hungary, Servia and Russia pigs are frequently infested with flukes. There is a fluke called " Gastrodiscus hominis " (bed-pan fluke) found in man, which is not uncommon in Assam ; it is an intestinal fluke.

In Asia Minor there is a pharyngeal invasion by flukes, said to be due to eating raw goat's liver.

In China there is a fluke which is normally parasitic of pig. In various parts of that country it commonly occurs in man, with gastro-intestinal symptoms. Also in India—Burma.

A trematode called "Distomum sineuse" is an endemic in Japan and causes severe hepatitis.

LIFE HISTORY OF DISTOMUM HEPATICUM.

The ovarian cell segments and goes through certain stages—morula, blastula, and gastrula—and finally reaches a larval form, miracidium, which is an oval body, with a gut and two unicellular glands on either side, opening into the gut. The surface is ciliated. It possesses nerve gangline, eye spots, flame cells, and excretory tubule. Also it possesses a number of masses of cells which are loose in the body cavity called " germ balls ; " possibly these are derived from the original ovum. The miracidium gets out of the cell into the water, and swims about. It enters the soft parts of a snail and now changes to form a sporocyst.

The sporocyst is a relatively fusiform tube lined with epithelium. All the organs disappear and there remains an irregular body (which may be the remains of the eye spots). The cavity is almost filled with germ balls, or germ massses. These germ masses give rise to next stage. It also posseses pigmented eye spots.

Inside the sporocyst form the germ balls develop the rediæ. The rediæ are elongated in shape. They have a pharynx, and a gut lined with epithelium ; on the surface are ridges and a birth pore. The rediæ burst out the sporocyst and get to the liver of the snail. They are about 2 mm. in length, Inside is filled with germ balls.

Inside the redia develop the circaria—*i.e.*, a young fluke in all details with a tail and cutaneous glands, maybe other slight differences. They escape from the redia by the birth pore, and then finally out of the snail into water, and swim about by means of the tail. Eventually they drop their tail and encyst. The cyst being formed by the cutaneous glands, encystment takes place on the grass.

When a sheep or bovine animal devours the cyst, the wall gets dissolved in the stomach and the young fluke goes to the liver. There may be some other complications, as they may be devoured by fish, toads, etc.

It will be seen that from one fertilised egg either several cercariæ are formed, each capsule of which becomes an adult trematode, or that the process of sexual reproduction may be repeated, and from one fertilised egg many rediæ are formed, and from each redia many cercariæ. Each cercaria may become an adult sexually mature trematode.

MODE OF PRESERVATION OF FLUKES.

Fill one third (⅓) of a test-tube with salt solution. Place the flukes in this solution; skake well for about 2 minutes; the object is to stretch the flukes.

Add an equal volume of saturated watery sublimate (10 per cent.) quickly before the fluke has contracted after first shaking. Shake again for five minutes. Place the test-tube flat and let it remain so for twenty-four hours. Transfer next day to 70 per cent. alcohol, and leave in this permanently.

For large flukes it is generally necessary to exercise some pressure as they are somewhat muscular. Compress by placing a glass plate over them and place between two slides and cover the whole with fixative such as sublimate or formalin or alcohol.

EXAMINATION AND STAINING OF FLUKES.

Unstained—

1 Dehydrate in alcohol gradually.
2. Clear in cedar wood oil or creosote. (Oil of cloves and Xylol not used because they harden the fluke.)

Stained—

1. Bring the flukes from fixative into water, and wash off the fixative.
2. Stain in acetic carmin (1 in 40) over night.
3. Wash in water to remove the alum in the stain (15 minutes).
4. Differentiate by means of acid alcohol (alcohol 70 per cent.) 100. HCL (hydrochloric acid) 5 drops. Leave in acid alcohol for about twelve hours.
5. Pass through alcohol and clear with cedar wood oil and mount in balsam.

It is best with all these stains to use dilute solutions for a long time nstead of strong solutions for a short time. Dilute hæmatoxylin can be used instead of acetic alum carmine, but the latter gives the best esults.

PROPHYLAXIS.

Good land-drainage. Surface dressing of salt. Avoid when possible keeping sheep on the same pasture both summer and winter. Avoid flat marshes, unless they are salt marshes.

Allow the sheep a liberal quantity of salt, as they require it, like horses and cattle.

Sheep should be carefully examined periodically, and if one has the least suspicion of fluke disease, they should be removed to dry pasture, or preferably salt marshes, and treat them with extractum Filicis liquidum—

> "That dire distemper sometimes may the swain,
> Though late, discern; when on the lifted lid
> Or visual orb the turgid veins are pale;
> The swelling liver, then her putrid store
> Begins to feel. Even yet thy skill exert,
> Nor suffer weak despair to fold thy arms
> Again detersive salt apply, or shed
> The hoary medicine o'er their acid food."
>
> —*Dyers Fleece Book I.*

From a jurisprudence point of view, this is an important disease, and much concerns the veterinary surgeon. Cases are on record where the vendor has been sued for damages where a guarantee had been given that the sheep were free from disease at the time of sale. It is a delicate question to settle whether they were "coathed" (rotted) before the sale, or not. Sheep will sometimes show symptoms very soon if the land is very badly infested. As at present, when the prices of sheep are so high, it is only natural that the buyer expects to get sound sheep after paying heavy prices for them.

DIPHTHERITIC VAGINITIS OF CATTLE.

BY C. A. POWELL, M.R.C.V.S.,
The Sand House, Woburn.

IN country practice one occasionally comes across a form of vaginitis, following parturition in cattle, about which, on reference to text-books, one either fails to find any mention or the information afforded is of a very meagre character.

Moussu and Dollar's "Diseases of Cattle," etc., give a fairly good description of it under the heading of Croupal Vaginitis, but the prognosis and treatment are very discouraging. Before, however, alluding to the latter I do not think I can do better than quote them in full.

"Croupal Vaginitis is a form of acute vaginitis, from which it is distinguished by the formation of false membranes, resembling those of diphtheria, over the whole of the vaginal mucous membrane.

"It was described by Baumeister. Moussu had only seen one case, and that at a period which rendered recovery out of the question.

"*Symptoms.*—The external symptoms are those of acute vaginitis, with a greyish, fetid, purulent or sanguinolent discharge. On examination the mucous membrane is found to be covered with yellowish-greyish false membranes, and with vegetations of a greyish, dirty, verrucous appearance. The entire extent of the vaginal mucous membrane may be attacked, together with the neck of the uterus. In Moussu's case the uterus itself was entirely invaded. These false membranes and vegetations are very adherent, and bleed freely at the slightest touch. They are apt to extend by degrees. The cause of this infection has not yet been determined. It appears to obtain access to the parts during parturition and develops insidiously for a week or two, when widespread lesions have already formed.

"The *diagnosis* is extremely easy.

"The *prognosis* is grave, for the lesions have a tendency to extend towards neighbouring organs; moreover the general health is severely affected, there is rapid wasting and continued fever, and death occurs from exhaustion, intoxication, and, possibly, infection.

"*Treatment.*—The treatment suggested for the ordinary acute forms appears to be useless in this condition. The new membranes show too many folds, depressions, and accidental cul-de-sacs for simple injections to have any real effect. Better results might be expected from packing with antiseptic gauze or from the use of antiseptic ointments applied after washing out the cavity with permanganate of potash solution or hydroxyl.

"Curettage followed by the use of gauze dressings might also be tried; considerable difficulty must necessarily be anticipated in operating in a cavity which has become inextensible, and partly filled with vegetations and false membranes."

Now for my own experiences. For some years I had occasionally met with cases of this disease which gave me no end of trouble—were protracted, and invariably ended in being slaughtered as incurable, or death occurring as the result of pelvic or general peritonitis.

Nothing in the way of any remedies, either local or general, seemed to stay its progress in the least. Everything I could think or read of was tried, even the at one time much-vaunted chinosol in very strong solutions, but without avail, and it was not until the following, which I now describe, did I obtain a recovery.

A short horn heifer—been calved about a week—membranes retained, movement very stiff, fever, loss of appetite, back arched and constant straining, membranes very much decomposed, vulva swollen, and discharging a thin, sanious, foul-smelling material.

The membranes were fairly easily removed, after which examination showed the vaginal walls to be covered with dirty grey membranes of a leathery character, in parts penetrating deeply into crevices in the mucous lining down into the deeper structures, which were tumefied and swollen. Portions of the diphtheritic membrane could only be detached with difficulty, as it was intimately adherent to the mucous lining. When detached the surface of the latter presented a raw, angry-looking appearance, covered with fine, granular-looking projections on which the false membrane rapidly re-formed.

It gave a roughened feel to the touch, and passing one's hand in as far as the os, one could find deep fissures, especially in the region surrounding the os. The discharge from this was of a sour, fetid odour, acrid in character, staining and roughening the skin of the hand.

Recognising that I had a case of diphtheritic vaginitis to deal with, that the case was worth nothing to kill, and, reasoning from previous experience, it was a practically hopeless one, I decided on severe and drastic measures. I first irrigated the uterus thoroughly with a fairly hot solution of krisophen. I then made a swab of tow, soaked it in a saturated solution of hydrarg. perchlor. in methylated spirit, and applied thoroughly as a swab to the whole of the vaginal surface. I then packed each cul-de-sac with pledgets of double cyanide gauze soaked in the same solution. Tonics in the shape of iron, quinine, and Ol. Tereb. were prescribed, and the case left.

On my next visit, two days later, I found the animal improved. I removed the pledgets of gauze and found the false membranes had begun to slough, leaving a healthy granulating surface beneath. This time I irrigated the uterus, the os of which had become very constricted, with a 1 in 2,000 solution of hyd. perchlor. and again swabbed the diphtheritic surface as before, packing again with gauze soaked in a weaker solution.

On my next visit I found progress maintained—appetite returning and improvement manifest. I again removed pledgets, but did not repack, irrigated uterus, and swabbed any suspicious place on the vaginal wall with the strong solution. I found scarcely any fresh growth of false membrane, and the cul-de-sacs were showing a tendency to fill up. I left hyd. perchlor. to make a 1 in 1,000 solution, to be injected into the vaginal cavity with an ordinary clyster syringe with a short nozzle daily, and continued internal treatment as before. I continued personal attention every two or three days, and in a fortnight the case had quite recovered, and the last I saw of the animal—some months afterwards—she was ready for the butcher; in fact, I should not have known her had not the owner pointed her out.

Since then I have treated several cases in the same manner with good results. In one case, not having any perchloride with me, I used the ordinary Liq. Zinci Chlor. diluted to half its strength with water, and applied with a swab thoroughly to the diseased surface. In this case, however, which was in its early stages, I did not leave any tampons *in situ*, as this agent when so applied tends to penetrate too deeply. I followed this up with daily irrigations of a 1 in 1,000 hyd. perchlor. solution, together with internal administration of tonics. Recovery was very rapid in this case.

For irrigating the uterus, I use an ordinary Winton's enema pump with rubber tube, to the end of which is affixed an ordinary human œsophageal tube, which I find is introduced easily into the os, the lumen of which is often constricted to the size of one's little finger, and with less risk of penetrating the debilitated and inflamed uterine wall. The injections, swabbing and plugging cause severe straining, which, however, does no harm, and soon passes off, and in 24 hours improvement is manifest. I have had some very bad advanced cases where the animal has been a complete wreck, getting up with difficulty, recover completely; and where the case is met with where the disease is in the early stage, and the mucous membrane only partially invaded, recovery is complete in a few days. Very bad cases take about a fortnight, and even after a healthy condition of the uterus and vaginal walls has been established, recovery of condition is necessarily a long time. In these cases tonics such as iron, quinine, and nux vomica may be given for a week or two with advantage.

The membrane formed very much simulates that met with in the so-called diphtheria of young calves, where one gets a diphtheritic sloughing of the buccal, pharyngeal, and lingual mucous membrane extending into the deeper structures.

Detaching the necrosed portions and swabbing with the before mentioned solutions—either zinc or hydrarg—daily as necessary gives very good results, but it must be done thoroughly by the veterinary surgeon in attendance; leaving it to the herdsman, in my experience, does not give satisfactory results.

Iodine with Pot. Iodid. in small doses may be given internally with benefit. Daily attention to the mouth is absolutely necessary, and the removal of masticated masses of hay, which are sure to accumulate.

A DELAYED FRACTURE OF THE HUMERUS.

By WM. LOTHIAN, M.R.C.V.S.,
Duns, Berwickshire.

THE subject of this notice was a middle-aged chestnut cob, which had the distinction of having done his bit in France, and was going at grass with a work horse. Three days previous to my seeing him he had been kicked on the near arm, just about the middle of the flexor brachii muscle. There was little swelling, and the wound was not large. He stood on the leg; it seemed to carry a fair share of the weight, but he had difficulty in flexing the forearm and extending the leg. Thus I thought was due to injury of the muscle. Warm, antiseptic fomentations were applied.

Ten days later I was asked to see him again, as improvement was slight. However, the day previous he had been removed to a loose box, had laid down, and seemed considerably better; he walked out of stable and back again to loose box. Next day I was sent for again, and found the leg pendulous, and the humerus fractured. He was destroyed and a *P.M.* examination made, when the bone was found to be fractured into four large and four small pieces. This was fourteen days after he received the kick.

I did not suspect fracture, but this case suggests the necessity of taking the same precautionary measures in kicks on the humerus as we do in those of the tibia.

RADIAL PARALYSIS IN THE COW.

THE below somewhat rare condition in cattle, showing the dropped elbow, occurred in the practice of Mr. H. L. Roberts, of Ipswich. The young cow had a bad attack of milk fever. During the night she recovered consciousness and attempted to rise, but slipped on the bricks in so doing. The condition indicated was then noticed. The photograph was taken by Mr. Reginald Holmes, student at the Royal Veterinary College, London.

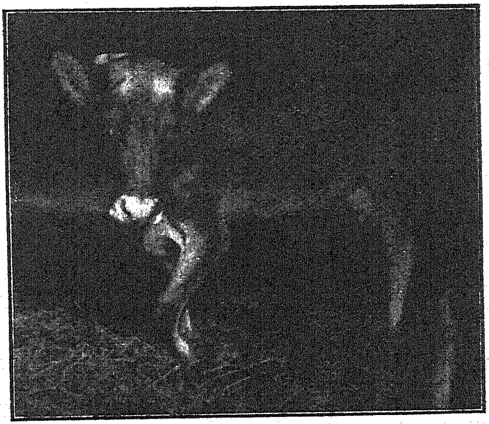

PHOTO OF A COW WITH RADIAL PARALYSIS.

ALOPECIA.

By G. MAYALL, M.R.C.V.S.

ALOPECIA is said to be due to disturbance of the nutrition of the skin. An examination of skin scrapings under the microscope will distinguish it from acariasis. It is not contagious, and there is apparently no organic or parasitic disease of the skin. It is stated that it may arise from influences which injuriously affect the trophic nerves. Some authors believe that it occurs chiefly in spring after copious sweating and gastric disturbances. In the human subject food or medicine is given which stimulates the nutrition of the nerves, as fat, phosphates, crushed wheat or fish.

The complaint chiefly affects horses, cattle, and dogs. In the last named I have seen it chiefly in Poms, and occasionally in Yorkshire and Aberdeen terriers.

In a cart-horse in a large stud that I attend I have one subject that regularly suffers at the fall of the year. I have noticed it now on five annual occasions. The place most regularly attacked is the hollow of the near flank. Little spots arise, which widen and coalesce, there is a fair amount of dry scale, and eventually an oval bare patch arises about a foot and a half long and a foot wide. Application of carbolised oil or lead and potash oils soon brings about complete recovery, and during nine months of the year the horse appears to have a perfect coat of hair. Occasionally one side of the neck suffers in the same way. The subject is always on the lean side and of nervous temperament and bad to shoe behind; but he is a good worker and never has suffered from any general disease. The proper name for the affection is, I believe, *alopecia areata*. I have only seen one case of *alopecia symptomatica*, and that was when accompanying Capt. Guy Sutton, F.R.C.V.S., on his rounds some years ago. In this case the horse was absolutely bare all over and looked like an equine in elephantine disguise.

In Poms I have effected improvement by dressing the skin with melted coconut oil and the internal administration of iron and arsenious iodide. I do not believe that poor food is a contributing cause, because I have seen it in both men and animals where the feeding was first-class. The horse patient mentioned herein is very liberally fed. For years and years this affection has been known, but the cause of it seems still to be hidden in some mist of obscurity.

A NOTE ON JHOOLING IN CAMELS*.

BY H. E. CROSS, M.R.C.V.S., D.V.H., A.Sc.,
Camel Specialist, Sohawa.

JHOOLING, or Jhoolak as the disease is sometimes called, is a contagious disease of camels, manifesting itself in the formation of local tumours, hot and painful, of a fibrous character and terminating in suppuration and raw patches.

Distribution.—The disease is widely distributed throughout the Punjab ; it is not so common in the Lahore District as in the Jhelum and Rawalpindi Districts. It usually occurs in the cold weather, but is met with occasionally in the hot weather.

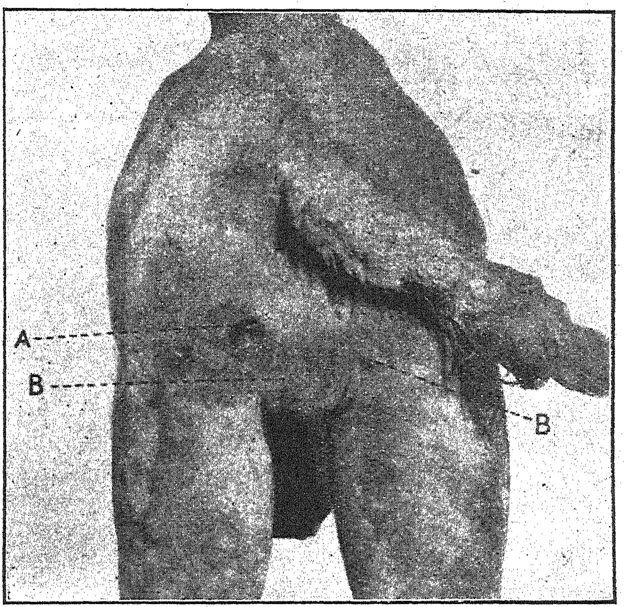

Fig. 1.—Showing Raw Patch (A) and Swelling (B).

Etiology.—The causal organism has not yet been isolated, though it is probably a fungus.

Pathogenicity.—Inoculation of emulsion of the lesion into horses, cattle, buffaloes, dogs, guinea-pigs, and rabbits does not produce the disease.

If portions of the lesion are rubbed on the skin, whether the skin be scarified or not, no jhooling lesion is produced in any of the above animals.

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* Bulletin No. 72, Agricultural Research Institute, Pusa.

Horses, buffaloes, and cattle kept in contact with camels suffering from jhooling do not contract the disease.

When portions of a jhooling lesion are rubbed on the scarified skin of healthy camels the disease develops after a few days. In only one case did the disease develop when a portion of a jhooling lesion was rubbed on the unscarified skin of healthy camels.

Healthy camels kept in contact with camels suffering from jhooling contract the disease rapidly.

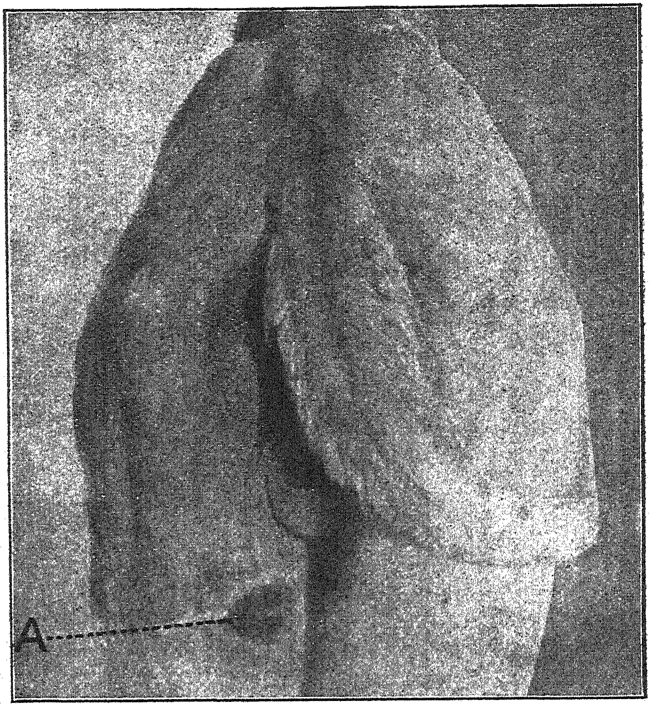

Fig. 2.—Showing Raw Patch (A).

Symptoms.—The first symptom is a hot, hard, and painful swelling varying from 1 to 5 inches in diameter, usually on the neck, hindquarters, or testicle, but the lesions may occur in almost every part of the body. After a few days the swelling becomes very irritating, and, if situated in any part of the body that the camel can reach with his teeth, he will gnaw at it, leaving a raw patch. In all cases after the lapse of some time suppuration takes place and finally the wound heals, leaving a small white patch which lasts for several months. As a rule several lesions are found on a camel suffering from the disease, and the camel loses condition. The lesions take a long time to heal, and if situated in any part that comes in contact with the *palan* (saddle) the camel has to be put off work.

Anatomical changes.—The tumour consists of fibrous tissue, finally undergoing suppuration. Examination of the pus reveals streptococci; no staphylococci have been observed. In camels suffering from jhooling, on which I have made *post-mortems*, no lesions have been observed in the internal organs.

Treatment 1.—The best treatment, and one which gives very satisfactory results, is the following:—A strong red iodide of mercury blister should be applied, and after three days washed off with soap and water. The diseased areas should then be excised and finely powdered permanganate of potash applied. The permanganate of potash must be well rubbed in, and not simply dusted on. Three dressings at intervals of four days are usually sufficient.

Treatment 2.—Sometimes good results are obtained by excising the lesion and then applying pure phenyl or carbolic acid. The following day the wounds should be thoroughly washed with water and then treated with black wash (30 grains calomel, ½ ounce of glycerine, 1¼ ounces of tragacanth mucilage and lime water to make 10 ounces of lotion).

Camelmen apply boiling ghee to the lesions and "fire" round the edges of the lesions with the idea of preventing the lesion spreading. This treatment cannot, however, be considered satisfactory.

If the lesions are on the testicle, or in situations where they can be reached by the tail, the tail must be tied.

Prevention.—Camelmen are well aware of the contagious nature of this disease. If they have a camel suffering from jhooling lesions in the neck, this camel is always placed first in the string of camels; whereas if the lesions are on the hindquarters the camel is tied last.

Should a case of jhooling occur amongst a number of camels, it should be at once isolated from all the other camels. The remaining camels should be very carefully examined, and divided up into lots and not allowed to mix. Should more cases be found they should be at once isolated. The disease spreads very rapidly amongst camels and causes a great deal of trouble, so that every effort should be made to prevent the disease from spreading by careful examination and segregation. In camels suffering from jhooling, lesions in different stages are met with—healed up lesions, raw patches, and swellings.

No camel should be bought if small hard white spots are observed on the skin (they undoubtedly represent healed up jhooling lesions) without careful inspection for raw patches and swellings.

General Article.

HORSE FLESH AS HUMAN FOOD.*

BY L. PRICE,

New York City.

Historical Outline.—The use of horseflesh as a human food is as early a custom as that of using the flesh of the other food producing animals. Archæologists have unearthed proof of its use by the caveman in northern Europe. That this custom was in progress long before the time of Moses is evident by the prohibitive clause in the Mosaic Law against the consumption of horsemeat. Hippocrates refers to its use and Herodotus describes it as an early custom that prevailed from the extreme East to the Ural Mountains. Later, Xenophon, Pliny, and Galen gave records of its use among the early Persians, Greeks, and Romans. The Saxon tribes that occupied northern Europe sacrificed the horse as the most noble animal to their gods Odin and Freya, and accompanied the ceremonies of the sacrifices with great feasts in which the eating of horseflesh was customary. It was in their zeal to spread Christianity and to remove all signs of pagan worship and sacrifice that Pope Gregory III and his successor, Zacharais I sent to St. Boniface, the Christian apostle in the Germanic countries, edicts prohibiting the use of horseflesh. These decrees were also issued to the people of Iceland, among whom hippophagy was so popular that it was only in the year 1000, three centuries later, that the people openly discontinued this custom.

The nomadic tribes of Tartars, Kirghis, and Kalmucks wandering about south-eastern Russia and its Asiatic possessions have used horsemeat for a long time, and were extremely fond of it. In Persia, asses were considered a delicacy, and throughout Asia the eating of horseflesh was customary. The Chinese had used horseflesh for ages, and, according to Ostertag, had even developed a special breed of " fat " horse, that was characterised by its delicate bone structure, fattening powers, and savory meat.

A few centuries ago, during the period of exploration and discovery, the following information appears in regard to the use of horseflesh :—

Phillips writes of the use of the flesh of horses, asses, and mules by the Moors in Tunis, Algiers, and also of the presence of a species of small horse that was raised solely for food purposes by negroes

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*Presented at the meeting of the New York City Veterinary Medical Association, April, 1917, and reprinted from the *Journal of the American Veterinary Medical Association,*.

in Juida, Africa. In Marmol, Africa, wild horses were used for food by the natives. In South America, French and English explorers repeatedly mention the use of the flesh of wild and domestic horses for food purposes as a custom in the various countries. Sir Francis B. Head stated that the Pampas ate the flesh of mares, which they never rode. Delvaille refers to the natives of Bolivia as preferring horsemeat, and others state that hippophagy was in vogue in Chili and among the Patagonians.

During the French Revolution, the Parisians used horseflesh constantly for six months without bad results. To what extent and whether the custom of eating horsemeat was popular or prevalent among the people of the European countries prior to the beginning of the nineteenth century cannot be determined but it appears that, later its sale and use was gradually permitted by the various governments as a necessary or progressive measure. Thus in 1807, in Denmark, when the Danes were under siege, this measure was officially adopted. Larrey, the famous surgeon to the armies of Napoleon, used horsemeat to feed the sick and convalescent soldiers in the various campaigns, and mentions its use in combating a scurvy epidemic. In 1840 Munich and in 1855 Germany permitted the sale and use of horseflesh. Vienna sanctioned its public sale in 1854. In France, Decroix, St. Hilaire and others had publicly advocated the use of horsemeat for many years and finally succeeded in influencing the Government to authorise its sale and use on July 9th, 1866. Horsemeat is now publicly sold in the other European countries with various degrees of popularity.

Use in Europe and United States.—In 1899 a regulation was passed in Great Britain permitting the sale of horsemeat. No statistics of the extent of the use of horsemeat in Great Britain were available. There lately appeared the following in the *London Meat Trade Journal*: "Shops for the sale of horseflesh are being introduced into every large town. The high price of beef, mutton and pork is giving horseflesh an opportunity to acquire favour, and if the present cost of living continues after the war, horseflesh may become a permanent article of food." (Quoted from the *Butchers' Advocate.*)

In France the use of horsemeat has been marked by an increasing public demand, as may be seen from the following statistical data. These are incomplete and probably underestimated. Ostertag states that two-thirds of the horsemeat is manufactured into sausages and also that more than 100,000 of the 600,000 families in Paris use horsemeat. In 1910 twenty-nine million pounds of horsemeat was produced for consumption in Paris and its environs.

NUMBER OF HORSES, ASSES AND MULES SLAUGHTERED IN PARIS—1866–1910 (Gathered from various sources).

	Total.	Horses.	Asses.	Mules.
1866 (from July 9)	902	—	—	—
1867	2,125	2,069	59	24
1868	2,405	2,297	97	11
1870–71	65,000	64,362	635	3
1872	5,732	5,034	675	23
1875	6,865	6,448	394	23
1878	11,319	10,800	438	31
1888	13,475	—	—	—
1898	21,476	—	—	—
1900	25,059	—	—	—
1902	31,342	—	—	—
1904	44,279	—	—	—
1906	58,856	—	—	—
1910	60,338	57,734	822	223

There are two horse abattoirs under municipal control which supply Paris. The retail establishments handling horsemeat rapidly increased in number from the date of authorisation of its sale. In 1874 there were 48; in 1889, 132; in 1894, 212; and in 1906, 299. (Moreau 9.)

NUMBER OF HORSES SLAUGHTERED IN GERMANY—(Ostertag) 10.

In Prussia ..	1890–91 ..	53,281 horses.
	1893–94 ..	58,306 ,,
	1899 ..	63,801 ,,

According to the twenty-eighth annual report of the Bureau of Animal Industry,* Germany, in 1909, slaughtered 152,214 horses, which provided 79,000,000 lb. of meat; approximately 1½ lb. per capita. (There were also 6,990 dogs slaughtered for food purposes.)

NUMBER OF HORSES SLAUGHTERED IN MUNICIPAL ABATTOIRS IN CERTAIN CITIES (15).

12,890 horses slaughtered at Municipal Abattoir in Berlin.
18,290 ,, ,, ,, ,, ,, Vienna, 1892.
7,132 ,, ,, ,, ,, ,, Milan, Italy, 1907.
1,375 ,, ,, ,, ,, ,, Liége, Belgium, 1906.

COMPARISON OF NUMBER OF ANIMALS SLAUGHTERED AND AVERAGE PER CAPITA CONSUMPTION OF MEAT IN BELGIUM 1905–1909 (2).

Horses slaughtered	38,200	Horsemeat consumed per capita ..	1·51 kgm.
Cattle ,,	438,900	Beef consumed per capita	17·54 ,,
Calves ,,	350,500	Veal consumed per capita	3·03 ,,
Lambs and sheep slaughtered	352,400	Lamb and mutton consumed per capita	0·74 ,,

At the Municipal Abattoir, in Odessa, Russia, out of a yearly slaughter of 150,000 food animals, about 300 horses are slaughtered during the winter months for use by the Tartars.

Probably the first mention of the use of horseflesh in the United States was made in 1898, when in the Appropriation of that year for the Bureau of Animal Industry provision was made "That live horses and the carcasses and the products thereof be entitled to the same inspection as other animals, carcasses and products thereof."

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*(Statistique Agricole Annuelle—Dept. of Seine 28, B.A.I. Annual Report).

Most of the horsemeat produced was prepared for export trade, as may be seen from figures below, though probably some of it was also for domestic consumption. In fact, it seems that this regulation was enacted solely for the purpose of encouraging exportation, as the following letter by Vice-Consul Blom appears, in the Consular Report of April, 1900: "Several years ago I called the attention of Danish dealers in horsemeat to the American supply. I have now to report that the business is increasing rapidly, and the meat from the United States gives satisfaction. The consumption of horsemeat in Denmark is comparatively large, and Copenhagen is a distributing port for Sweden, Norway, Finland, Russia, and the German Baltic."

HORSES EXPORTED FROM THE UNITED STATES, 1900-1903 (1).

Year.	No. packages inspected horsemeat.	No. certificates issued.	Packages Exported.	Weight.
1900	602	8	472	188,800 lb.
1901	821	9	880	249,900 ,,
1902	638	11	638	170,986 ,,
1903	70	1 shipment	70	28,000 ,,

Description.—The dressed carcass of the horse is characterised by its dark colour, the absence of any extensive fat deposits, and the peculiar yellow colouring of the fat. It may be readily recognised by the length of the neck, number of ribs, the non-lobulated kidney, and the many distinguishing bony structures, etc., though there may be considerable variation in the different breeds and types. There is lack of subcutaneous fat that makes the removal of the hide extremely difficult, and the fat deposits in the region of the kidney and the flank are relatively meagre, even in well nourished animals. In such animals the tendency is for the fat to be of a lighter shade, and there usually is a rather thick layer on the median line and lower abdominal wall; there is also a peculiar fat deposit of firm consistency on the neck (sometimes called "comb-fat") which differs from the usual yellow soft horse fat. The mesenteric fat has a darker yellow colour and is scantily deposited.

Horsemeat has a deep, dark, red colour, bordering almost on brown or black, and a bluish sheen appears on exposure to the air. On section, the fascia is very prominent, and the absence of intermuscular fat and the lack of the marbling quality is very noticeable. Leach describes horseflesh as having a coarser texture, and short muscle fibres, as a rule; Edelman describes the fibres as very fine; Huidekoper refers to the flesh of asses and mules as having a finer grain than that of the horse.

The bone-marrow is soft, greasy, and waxlike, of a yellow colour, and stiffens when exposed to the air. The offal of the horse, ass or mule, like the offal from the other food-producing animals, may be grouped into edible, inedible, and therapeutic by-products.

Composition of Horsemeat (Wiley) (13).

Water	69·81
Water in fat-free substance	76·91
Fat	9·61
Protein	19·47
Protein insoluble in water	14·83
Gelatinous protein	1·23
Meat bases	1·70
Glycogen	1·82
Ash	1·01

Water Protein and Fats in Common Meats—(Rubner)* (12).

	Water.	Protein.	Fat.		Water.	Protein.	Fat.
Lean beef	76·3	20·5	1·8	Fat beef	71·0	19·9	7·7
Lean veal	78·8	19·8	0·8	Fat veal	72·3	18·9	7·4
Lean pork	72·6	19·9	6·8	Fat pork	47·4	14·5	37·3
Lean poultry	76·2	19·7	1·4	Fat poultry	70·0	8·5	9·3
Very lean mutton	76·0	18·1	5·8	Very fat mutton	47·9	19·8	36·3
Horsemeat	72·3	21·7	2·5	Horsemeat	72·3	21·7	2·5

In 100 parts of meat free from fat the following amount of dry substance was found (Rubner, 12) :—

Beef	21–22
Veal	20–21
Pork	21–23
Mutton	21
Horse	23–25

*Note.—In the edition of Rubner (Lehrbuch der Hygiene) consulted, evidently composition for fat beef was given for lean beef, as numbers given above were in transposed order.

In the chemical analysis of the muscles of the various animals, there are minor differences that bring out the distinguishing properties of the various meats. While horseflesh does not materially differ to any great extent from the flesh of other animals, some of its individual characteristics are : the relatively large proportion of glycogen, the presence of certain extractives, and the peculiar qualities of horse fat.

Glycogen, or animal starch, is normally found in the muscles and in the liver, where it is stored up for future distribution in the body. Its physiological function is to aid in the metabolic production of muscular energy and animal fat, and its presence is not marked by a constant quantity in all the muscles of the body. An herbivorous diet that is rich is carbohydrates may be a probable factor in an increased glycogen content in the muscles of horses. Glycogen is present in greater quantities in well-nourished horses, while it may be slight or totally lacking in overworked and under-fed animals. Lobster and liver are other foods containing a relatively high percentage of glycogen, and are high in public favour.

Leach states that taurin is present in the flesh of the horse. Taurin is an organic compound that originates from proteids and belongs to that class of nitrogenous waste products or extractives in which creatine, creatinine, xanthine, hypo-xanthine, etc., belong.

These latter named compounds are commonly found in variable proportions in the muscles of all animals.

A special characteristic of horse fat is its high content of olein. Horsefat has also a very low melting point, a characteristic crystallisation form, a higher heat value, and a greater iodine number, etc.

Meat Inspection.—Horses are usually slaughtered in abattoirs operated exclusively for this purpose. To conduct a careful and thorough ante-mortem examination, a well constructed stable, with sufficient space and stable room, is necessary. The importance of the ante-mortem examination may be emphasised for the following reasons: The majority of the horses that would be presented at the abattoir would naturally not be in a perfectly sound condition, and it is of great importance to recognise the condition that sends each animal to the slaughter-house, and to ascertain if this condition affects its acceptability. The ante-mortem examination would also eliminate certain conditions of diseases that may not be marked by visible pathological lesions, and yet render the flesh dangerous or unwholesome. Finally, it would serve as an effective control of glanders, the early discovery of which is so important that every possible precaution to eliminate its presence in a food product is justified. A diagnostic mallein inoculation test supplemented by a suitable laboratory serological test should be the routine procedure.

The necessity for a suitable stable under the complete control of the public health authorities is further emphasised in order to ensure a proper and effective quarantine, and prevent any temptation on the part of those interested to foil, or interfere with, the natural course and outcome of the test.

RESULTS OF ANTE MORTEM INSPECTION OF HORSES (B.A.I 1899–1903) (1).

Year.	Horses Inspected.	Rejected—subjected to post-mortem exam. at abattoir.	Post-mortem inspection.	Carcasses condemned at abattoir.	Died at abattoir.
1899	3,232	27	2,232	181	43
1900	5.560	66	5,559	112	29
1901	1,991	3	1,992	103	27
1902	1,649	0	1,649	25	48
1903	3,344	0	344	11	0

The *post-mortem* examination of the horse should be carried out in a similar manner to that practised in the examination of cattle. A more detailed and careful inspection is carried on in examination of the head, which is split open so as to expose the mucous membranes of the nasal cavity, the turbinated bones, and the sinuses. A careful inspection is made of the mucous membranes of the larynx, pharynx, and trachea. Examination should also be made of the kidney, serous membrances lining the body cavities, the articulations, withers, skin, etc.

The pathological conditions met within the slaughtering of horses may be conveniently grouped as follows:—

1. Conditions that are not likely to be dangerous to man, and not affecting the wholesomeness of the food; this group would include those which were rendered useless for domestic service as a result of acute or chronic injury acquired through accident, overwork or misuse; also certain conditions, affecting sight, hearing, or ability to partake of food, thus handicapping or limiting the usefulness of the animal. Also conditions about the limbs involving the bony structure, tendons, and articulations. Perhaps also certain vices, lowering the working capacity of the horse. Parasites of the horse may also be included in this group. According to Ostertag, parasites found in the body of food animals may be grouped as follows:—" Parasites which are not transmissible to man; parasites which may be transmitted to man by eating meat; parasites which are not immediately harmful, but which may become so after a preliminary change of host." Under the last mentioned group, *Echinococcus polymorphus* may be considered, and as " they are more frequent in cattle than horses, they require no special reference." The parasites that may be transmissible to man by eating meat are not commonly known to occur in the flesh of the horse. Parasites found in the body of the horse under ordinary circumstances are not of special importance in considering meat inspection.

CONDITIONS CAUSING CONDEMNATION OF HORSES ON POST-MORTEM EXAMINATION (B.A.I. 1900–1903) (1).

	1900.	1901.	1902.	1903.
Tuberculosis	1	—	—	—
Abscesses	1	6	1	—
Pneumonia	6	3	—	1
Pleurisy	1	1	—	4
Carditis	1	—	—	—
Enteritis	1	3	1	—
Peritonitis	3	1	1	—
Metritis	1	3	—	1
Septicemia	12	17	12	2
Pyemia	5	4	1	1
Anæmia—Emaciation or Marasmus ..	37	11	3	—
High Temperature	2	—	1	—
Recent Parturition	2	—	—	—
Downers	29	4	—	—
Dead	29	27	48	—
Melanosis	1	2	4	—
Paraphymosis	1	0	—	—
Fistula	6	1	—	—
Open Joint	2	—	—	—
Gangrene	—	1	—	—
Pregnancy	—	40	—	—
Lymphangitis	—	2	—	—
Pharyngitis	—	1	—	—
Nasal discharge	—	2	—	—
Distemper	—	2	—	—
Jaundice	—	—	1	—

2. Conditions and diseases of horses which may affect the wholesomeness of the flesh or prove dangerous to man. These embrace extreme age, emaciation, suppurative conditions, diseases of unknown etiology, toxemias, etc.

3. This group includes dangerous infectious diseases of the Equidæ that may prove dangerous to man. For example, such as glanders, tetanus, less frequently rabies, tuberculosis, etc.

Opposition to horseflesh as a food.—The earliest and most effective opposition to the use of horseflesh is that in the Mosaic Law. The papal decrees of the seventh and eighth centuries stopping the custom of sacrificing horses and horseflesh that existed among the Germanic tribes and the people of Iceland have already been referred to. Probably to these religious restrictions is due the prejudice that grew against horseflesh, and exists even to the present day.

Considerable opposition is also due to the sentimental feeling for an animal as domesticated as the horse. Any such sentimental feeling must be regarded as inconsistent in view of the fact that other completely domesticated animals are slaughtered for food purposes. Indeed, it would be an act of mercy well earned by many a faithful horse, that has lost his early vigour, to be sent to the abattoir, rather than to allow him to fall into the hands of some huckster or cruel driver to be underfed and overworked to a gradual death.

Horsemeat is conceded to be a wholesome and nutritious food by eminent authorities in this country and abroad.

The use of horseflesh for human food should also be considered from the standpoint of public welfare and as an improving economic measure. It offers an economical, acceptable flesh food, especially for the workers who are unable to afford the luxury of the present high-priced meats, and still find it desirable or necessary to have meat as part of their daily diet.

It seems, indeed, unreasonable that so much valuable food should be wasted in the face of the privations that exist among the poorer population in the larger cities. Here the foreign element have, in the majority of cases, been initiated to the eating of horseflesh in their native land, and would gladly accept this product in view of its proportionately lower price.

The opposition to horsemeat on the grounds of its physical characteristics is unjustified. The taste of manufactured products or culinary preparations may be so disguised as to make recognition difficult or impossible. Certain preparations of horsemeat are relished and preferred by those who have not allowed prejudice to get the better of personal taste. A slight sweetness of taste is considered one of the qualities of horsemeat, while toughness is not necessarily characteristic of horsemeat any more than it is of any other meat, but depends rather upon the age, sex, and condition of the particular animal which it has been derived from.

Ostertag refers to Pflüger as mentioning that when horsemeat is used exclusively it is apt to cause diarrhœa, which is directly due to a substance present in horseflesh that is soluble in alcohol and passes over into the meat broth when horsemeat is cooked. This material consists of 75 per cent. leeithin and 25 per cent. of neutral fat and cholesterin. This injurious effect is in some manner avoided when the meat broth is poured off or when horsemeat is prepared together with beef or mutton tallow. Huidekoper states that horsemeat should always be broiled or roasted.

The following are the conclusions that were reached by the Italian Army Veterinarians Costa and Mori in regard to the use of refrigerated horsemeat: "Flesh of horses in normal physiological condition slaughtered under suitable rest, whether skinned or quartered and left in the skin, will keep perfectly well for two months, if subjected to a temperature between 1 and 4 degrees Centigrade, and an air moisture of 60 to 70 degrees." Meat cut in small pieces will not keep more than 25 to 30 days. Flesh from animals in normal but tired condition will not keep longer than 20 to 30 days, showing signs of decomposition in 15 days. The flesh in the skin, if withdrawn from the refrigerator every five days and left for 24 hours in ordinary temperature, keeps in good condition for 20 to 30 days; if carcasses, were skinned and quartered, preservation would be but 15 to 20 days. The liver does not keep more than eight to ten days, when it turns pitch black, becomes unsightly, and a few hours after removal from the cold cells decays, showing that this organ is the least resistant to chemical or bacterial change. The kidney keeps 20 days. Brain, if not removed from the skull, keeps two months; if removed, but one week at the longest. Loss in weight was from 8 per cent. to 10 per cent. in 30 days.

Refrigerated horseflesh after 15 days turns dark to black. The consistency remains normal for a long time. Chilled horseflesh becomes tender in 10 to 45 days; the outer surface appears brighter than fresh horsemeat. After ten days' storage in the cold room the meat cooks more rapidly than fresh meat and requires the same time as is necessary to cook unchilled beef of a two- to five-year old animal. The meat of tired animals was found not to cause any bad effects, but gave evidence of lack of taste."

Opposition to the use of the horse for food purposes as an individual cannot be upheld with any degree of consistency. Its particular habits of cleanliness, together with the careful domestic attention that it receives, place the horse in this respect on a higher plane than the other domestic animals. In the selection of food, the fastidiousness of the horse has often been exaggerated, nevertheless it is conceded that the horse is more discriminating in the selection of food than the other domesticated animals. In comparison with poultry or swine discussion is unnecessary.

The method of procedure of the ante-mortem examination described previously should allay the fears of the public in regard to the possibility of unfit, worn out, or emaciated animals being slaughtered. This careful examination, followed by a careful *post-mortem* examination, should give further assurance that every possible measure is taken to produce a wholesome product. Indeed, comparison with the method of procedure and the findings in slaughtering aged, worn out and emaciated dairy cattle would perhaps place horseflesh in a better light.

Tuberculosis exists in dairy cows in very great proportions, and a considerable number are passed for food purposes in spite of having some tubercular lesions. After slaughter the poor condition of many dairy cows does not allow them to be presented to the public by way of the butcher shop in the usual cuts. Nevertheless, the consumer approves this product in the form of bolognas, canned meats, sausages, etc., with an ever increasing demand, after the original meat has been made acceptable by the addition of condiments and flavourings of various kinds. Tuberculosis among horses in this country may be considered a negative factor in comparison to its frequent occurrence in cattle and swine.

While there are no parasites present in horseflesh that are known to be transmissible to the human species, many may become affected with tapeworm by eating beef or pork containing the larval forms of the parasite; and trichinosis may be produced by the eating of pork.

Restrictions and Control.—Because horsemeat and its products will be placed upon the market as inferior products and cheaper in price, adulterations and substitutions in various manners may be attempted by the unscrupulous. The public would be entitled to protection for such reasons as well as in consideration for those who have a natural antipathy for horsemeat. Such protection may be promoted by regulations governing the slaughter and sale of horsemeat, rigid routine inspection and laboratory tests of material suspected of adulteration or substitutions.

Regulations governing the slaughter of horses usually restrict the process to abattoirs specially designed for this purpose. The carcasses are stamped conspicuously or marked in some way in order to identify the nature of the meat. Selling horsemeat and its products is also limited to establishments that handle this product only, known signs, and the wrapping paper may also bear the information as to the nature of the article. Similar methods are used to control restaurants and factories handling horsemeat.

Rigid inspection should be exercised to detect unauthorised sale as well as any suspicion of adulteration or substitution, and legal prosecution should follow in all such cases.

Tests.—There are numerous laboratory tests that permit the detection of horsemeat, even when prepared in the form of sausages or other products. There are many different qualitative and quantitative tests for glycogen, which is present in larger quantities in horseflesh than it is in the flesh of the other food-producing animals. A glycogen test is more difficult to carry on in the presence of starch. Further possibilities of inaccuracy are likely when the sample is not fresh, as the glycogen in the flesh changes over very rapidly after slaughter to a reducing sugar which interferes with the procedure of the test.

GLYCOGEN CONTENT IN HORSEFLESH AND BEEF, ACCORDING TO AGE—(Ostertag) 10.

Species.	Age of Meat.	% of Glycogen.
Horse	3 hours	·700
,,	3 hours	1·026
,,	1 day	·373
,,	2 days	·603
,,	5 days	1·072
Beef	4 hours	·204
,,	½ hour	trace.
,,	2 days	·000
,,	5 days	·076

RELATIVE AMOUNTS OF GLYCOGEN—(Leach) 8.

		Glycogen direct.		Glycogen in dry substance.	
	Water.	Niebel Method.	Maryhofer Method.	Niebel.	Maryhofer.
Horseflesh	74·44	0·440	0·445	1·721	1·741
,,	74·87	0·600	0·520	2·388	2·069
,,	76·17	1·827	1·727	7·667	7·247
Veal	74·16	—	0·086	—	0·342
Pork	75·00	—	0·186	—	0·744

Wiley states that a safer test for detection of horseflesh than by proving the presence of glycogen is in the examination of horse fat. The fat is not so susceptible to change and may be effectively detected even when in finely comminuted state or in mixture with other meats. Horse fat has a lower melting point, a higher iodine number, and a higher heat value when mixed with sulphuric acid.

Ostertag refers to Nussberger as finding it possible to determine horse fat by means of a Zeiss refractometer, which found horse fat to have a higher refractive index than that of beef fat.

Fat.	Iodine Value.	Butyro—Refractometer Readings Temp. 40°.
Horse	71·86	53·7
Beef	38·46	49·0
Pork	50·70	48·6 to 51·2.

Horsemeat may also be detected by means of a blood serum, usually prepared from a rabbit that has been sensitised by inoculations with blood serum of the horse or with juice from horsemeat. On contact of this prepared rabbit serum with the juice of horsemeat a reaction takes place.

Summary.—Horsemeat has been used as a food since ancient times to the present day in different parts of the world.

The opposition to the use of horseflesh is mainly an inherited prejudice arising from early religious restrictions. The opposition on the ground of its peculiar properties is justified. Horsemeat may be considered a wholesome, nutritious, and economical food.

Horsemeat should be sold under special regulations, to prevent adulteration and substitution.

Every possible precaution should be exercised to eliminate glanders in horses offered for food.

According to certain writers horsemeat should be prepared in a certain manner.

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Reviews.

DEPARTMENT OF AGRICULTURE—CANADA. REPORT OF THE VETERINARY DIRECTOR-GENERAL FOR THE YEAR ENDING MARCH 31st, 1916. Published by J. de Labroquerie Taché, Ottawa. Price 5 cents.

This report by F. Torrance, B.A., D.V.S., shows that good progress has been made against disease in the Dominion, although the veterinary staff has been greatly depleted owing to the war. Owing to the great increase in the export of dressed meats the meat inspection division was kept very busy.

Glanders showed a considerable decrease, and out of a total of 241 horses killed the province of Saskatchewan contributed 191 cases. Eleven reactors were detected at the border in American horses, and were refused admittance to Canada. Saskatchewan, too, provided the greatest number of cases of mange in horses. A few outbreaks of anthrax occurred in Ontario and Quebec. The city of Saskatoon was put under the federal regulations as regards tuberculosis, and the tests were carried out without any friction; the results obtained were appreciated by the inhabitants of the city, and the Veterinary Director-General's Department was officially thanked. One hundred and sixty-four reactors were found.

The regulations provide for three methods of dealing with reactors: (1) Immediate slaughter; (2) slaughter after fattening; and (3) withdrawal from the raw milk trade. One hundred and fifty-three of the reactors were slaughtered, and ten owners withdrew their cows from the dairy business and had their licences cancelled. These ten cows were earmarked by punching out a large T in the right ear to indicate to would-be purchasers that they were tuberculous. The intradermal and subpalpebral tests were used in many cases, but they were on the whole neither so convenient nor reliable as the subcutaneous test. Five thousand three hundred and seventy-one cattle were tested by private practitioners, 366 of which reacted, and all reactors were permanently earmarked.

The immunising of hogs by the "serum alone" method reduced the losses from hog cholera very considerably. Formerly hogs exposed to infection were slaughtered; now those exposed to infection and not developing symptoms of the disease are immunised, fattened under quarantine regulations, and slaughtered under inspection for pork. The serum is injected by Government inspectors without cost to the pig owner. The benefit of the present procedure may be judged from the fact that 34,470 hogs were destroyed in 1915 as against 5,700 in 1916. The authorities in this country should note this. The deaths of several horses in Agassiz were attributed to eating bracken.

In the canned meat trade Canada could not supply the enormous demand of the British market, and large purchases of carcases were made from the States, but this supply was very carefully inspected and tinned, and shipped under special brands, so that it could not be shipped or sold as Canadian bacon, which has won a very good reputation in this country.

A larger proportion of whole carcases of hogs was condemned for tuberculosis than last year. One hundred and sixty-seven million pounds of bacon were exported, and 53,000,000 pounds of beef, which is not as good as Canada should do as compared with Demnark and Ireland.

[The record of work done is a progressive one and reflects credit on all concerned. Canada understands and appreciates the necessity for producing good foodstuffs and increasing her supply. G. M.

SPECIAL EQUINE THERAPY. By Mart R. Steffen, V.S., M.D.C. V.M. Series, No. 14. Edited by D. M. Campbell. Published by the American Veterinary Publishing Co., Chicago.

This is a useful text-book, describing some infrequent and at times puzzling ailments of the horse and their treatment. It also gives helpful advice regarding some common and troublesome diseases that the general practitioner meets with. The book is divided into three parts, and in Part I the author's aim is to advise on the commercial aspect of the treatment of prolonged, unfavourable, and hopeful cases, and the wisdom of making fees elastic according to the result. He also has some good counsel on observation and the use of drugs, and the importance of avoiding excessive doses of medicaments, and a reasoned use of the same.

Part II deals with a number of baffling affections, such as tympany of the guttural pouch, myxoid degeneration of the facial bones, melanosis, osteoporosis, pseudo-hysteria of unsexed males, leuthemia, diabetes mellitus and insipidus, footrot in colts, transient crural paralysis, paralysis of the cauda equina, etc.

Part III is devoted to some common poisonings, among which carbolic acid, aconite, and arsenic are mentioned.

Some of the author's treatments and statements are open to controversy, but much sound and valuable advice may be gathered from his words, and the object of his efforts is wholly admirable.

In laminitis the removal of the shoes is not advocated, but rather condemned. The horn is to be rasped thin at the coronet and painted over with tincture of iodine (an ounce to each foot), and the patient is to be encouraged to lie down. Unfortunately this, in a number of cases, is what the patient obstinately refuses to do, or, if he does, then he just as persistently refuses to get up.

The use of stock cough mixtures is condemned. The cause of the cough and its variable sources are to be ascertained and remedies applied accordingly.

The mortality rate in purpura is given at 40 per cent. in well marked cases. Potassium dichromate in 3- to 6-grain doses is mentioned, and the use of bacterins is said to have a favourable effect on the course of the disease.

Tuberculosis is stated to be a very rare disease of horses, and the remark is made that it may easily be mistaken for glanders. We do not think so, and no mention is made of stiffness or pain of the cervical vertebra in these cases. We think, too, that the diazo reaction for testing the urine may be usefully employed in some suspected cases.

Influenza is presumed to be contagious, and the period of time during which infection is liable to be spread is given as ten days. The author is a strong advocate for the use of bacterins and the abscess knife in strangles. Tonic treatment is recommended, but no febrifuge treatment. The experience in this country with serum has not been universally acclaimed; the verdict on it where it has been extensively used in Army cases is an adverse one; but odd trials have been recorded where it has proved very useful. The thoughtful man will read this work with pleasure, and when by his judgment he has sifted a fine supply of intellectual and obvious wheat from some light and airy chaff, he will be a stronger and more capable veterinarian. G. M.

VETERINARY OBSTETRICS.—By W. L. Williams, Professor of Obstetrics and Research Professor in the Diseases of Breeding Cattle in the New York State Veterinary College at Cornell University. Pp. xiv + 630, with three coloured plates and 140 illustrations in the text. Published by the author, Ithaca, N.Y., 1917. Price $5.

Those who know the keenness with which Professor Williams has entered into research in connection with contagious abortion will expect something good in this book, and they will not be disappointed. There are too few volumes containing a reasoned and practical survey of the field of obstetrics written by scientists with wide and plentiful technical experience. The text covers an extensive field, and only a broad review of its subject matter can be taken. The anatomy and physiology of the genital organs occupies a space of 131 pages, and a knowledge of them is necessary to an intelligent understanding of conception, pregnancy, the act of parturition, and the incidents connected with obstetric cases. The matter is interestingly, concisely, and lucidly written. The author denies that the penis of the bull can ever enter the cervical canal of the cow during copulation, and with regard to the mare states that " copulatory injuries from an unusually long penis occur in the vagina—not in the uterus."

The subjects of pregnancy and gestation are dealt with in forty-two pages, which include some very valuable information on the diagnosis of pregnancy. It seems possible by palpation of the uterus through the rectum to make an early diagnosis of pregnancy in cattle. This the author declares can be done almost immediately in the case of heifers by noting the hard, tense and smooth character of the uterus, and in cows the same condition may be noted in from forty to sixty days. As regards twin pregnancies, these are stated to be commonest in Holsteins and rarest in Jerseys. A short chapter on the Hygiene of Pregnant Animals is full of good advice and sound reasoning. Objection may, however, be taken to one point that the author seems to view with equanimity. We do not agree that pregnant animals of different spicees may be turned out together with any great amount of safety, and we think this is especially the case where the equine species are pastured or put in a straw yard with other pregnant domesticated animals. Especially does this apply to swine and mares. We have seen and heard of above one pregnant sow badly hit amidships by a playful and light-heeled mare.

The diseases of pregnancy and physiological parturition, including the care of the puerperal animal and care of the new-born, occupy a space of twenty-two pages. Rupture of the prepubian tendon is well described and illustrated and a very interesting and practical method of dealing with it is discussed. The value of treatment depends a good deal on the *entourage* of the patient, and the intelligence of the attendant in charge of the animal. The author advocates retaining the mare until the foal is weaned, keeping her as a brood mare or using her at moderate work.

Dystokia and the dealing with it occupies ninety-nine pages. Professor Williams gives some very wise advice to the obstetrist with regard to the best instruments, their construction and form, to use in his work. He does not go so far as a well-known and experienced practitioner among cattle who said, "Give me a knife, a blunt hook, and some handy cords, and I will take any parturition case that comes," but he does condemn screwed and jointed instruments and those not easily cleansible, and he favours the oval ring as a handle for instruments—a statement with which most country practitioners will heartily agree.

There is one tip, about fastening a cord on the lower jaw of a fœtus, that is too good not to mention here. He says: "One of the most useful places for the attachment of cords is the inferior maxilla of the fœtus. . . . Some obstetrists have said that a cord could not be applied securely to the lower jaw of the fœtus, especially the foal." By making an incision between the rami of the jaw into the oral cavity, pushing the loop well back over the jaw, and putting the free end of the cord through the incision in the oral cavity outward, and then drawing the cord tight, any amount of traction can be employed. Embryotomy, gastro-hysterotomy, and hysterectomy are dealt with in this section.

Maternal and fœtal dystokia include emphysema of the fœtus, uterine inertia, hydrocephalus, wry neck in the foal, and interlocking of the maternal and fœtal pelves. These sections are particularly strong and comprehensive, and new views and clear thinking make them eminently instructive and valuable. Wounds and injuries of the genital organs and puerperal infections and eclamptic diseases form the last sections of the work. The illustrations, printing, and general get-up of the book are first class.

The man in a busy country practice who has time to read should take this book on his knee in his spare moments and read it through and through. However good an obstetrist he may be, he will find fresh tips, live understanding, and very valuable information in this work. We think sometimes that an intelligent understanding of the state of affairs in a pregnant uterus is of more value to the obstetrist than a mere rough-and-ready overcoming of the difficulty presented. This book tells how to accomplish the task smoothly and effectively with the least injury to the patient and the greatest benefit to the new arrival. We wish the volume every success; it is a grand one. We look forward with pleasure to a book by the same author on "Diseases of the Genital Organs." We want some enlightenment on croupous and necrotic vulvitis and vaginitis in cattle, and hope we shall gain information thereon from him. G. M.

Personal.

NEW YEAR'S HONOURS.

To be Commander of the Order of the British Empire: Mr. F. W. Garnett, J.P., M.R.C.V.S., President of the Royal College of Veterinary Surgeons.

To be an Officer of the British Empire: Brevet-Major J. W. Rainey, A.V.C.

To be a Member of the Order of the British Empire: Mr. HERBERT MASON, Veterinary Service, Cairo.

THE profession will learn with regret of the following recent casualties :—

Capt. J. Shirley, A.V.C., killed, November 27th.
Capt. R. E. Leach, A.V.C., died of wounds, November 29th.
Capt. C. Tracey, A.V.C., and Capt. J. S. Keane, A.V.C., each of whom has been wounded.

Both of these officers held temporary commissions and volunteered at the call of duty and in response to the urgent appeals of the War Office Authorities.

Capt. Shirley was in private practice at Bedale, in Yorkshire, and is the son of the late Mr. Shirley, M.R.C.V.S., of Twickenham, whilst Capt. R. E. Leach was the eldest son of Mr. E. Leach, M.R.C.V.S., the well-known and popular veterinary surgeon of Newmarket.

Capt. Tracey came from Ballinasloe, in Ireland; whilst Capt. J. S. Keane was a recent graduate (1916) of Glasgow College.

Capt. Leishmann, A.V.C., has had the misfortune to fracture one of his legs, and is in hospital.

Truly the end of November has brought bad luck to the Veterinary Service in France, these casualties happening, as they have done, just at a time when more officers are being asked for than can be obtained.

Obituary.

THE LATE CAPTAIN A. W. CAMPBELL, WISHAW.

THE veterinary profession will learn with regret of the death from wounds of this promising young officer, who was the only son of Mr. Archibald Campbell, M.R.C.V.S., Wishaw. Educated at Wishaw High School and Hamilton Academy, Captain Campbell entered the Veterinary College, Glasgow, and no sooner had he successfully sat his final examination two years ago than he joined the Army, being granted a commission in the Veterinary Corps. After six weeks' training at Aldershot he sailed for Egypt, going out as officer in command of a veterinary section. Two months after he had landed in the East he was given the post of O.C. of a mobile veterinary section, and for a year and five months was attached to the first line of defence in Salonica. While there in January he was promoted to the rank of captain. Subsequently, at his own request, he was given a change of duties. He was sent with the mobile section, in July, to Palestine, where he was posted to the Mounted Brigade, attached to headquarters, and latterly was made a Brigade officer. He sustained a gunshot wound in the head in action on November 28th, and died in hospital on December 13th. Captain Campbell had a distinguished college career, and was one of the most brilliant students who have graduated from the Glasgow Veterinary College. He gained no fewer than seven medals and nine first-class certificates, and passed his final examination for the diploma of the Royal College of Veterinary Surgeons with honours.

SALVATORE BALDASSARE.

PROFESSOR BALDASSARE, who died recently, was in his 64th year, and was Director of the Veterinary School at Naples. Born at Foggia in 1853, he spent his early years in educational work, and eventually became assistant to Van Orstin, Director of the Zoological School at Portici. From there he went to Parma, where he was made Professor, and from thence he was called to Turin. Here, with Professors Bossi and Brasaco, he founded that standard work "Il Moderno Zoojatro." For some sixteen months he was engaged in the Argentine Republic, and after his return he became Director of the Veterinary School at Naples, which position he occupied until his death. On zoological points his name was always accepted as a very high authority, and his opinions will be much missed in that branch of science.

CARR, BEY.

WE regret to announce the death of El Miralai F. U. Carr, Bey, Principal Veterinary Officer Egyptian Army, and Director Veterinary Department Sudan Government, which took place in London on Saturday, the 10th ult.

The late Lieut.-Colonel Frederick Ulysses Carr received his commission as lieutenant in the Army Veterinary Department early in 1895. He served on the North Western Frontier of India on the Mohmand and Tirah Expeditions in 1897-98, receiving the medal with two clasps.

He served throughout the South African War, in which he was severely wounded, and promoted Veterinary-Captain. Among other operations he was present at Sanna's Post and received the Queen's medal with six clasps and the King's medal with two clasps.

Towards the end of the operations in South Africa he was attached to the staff of the Remount Commission, presided over by Lord Downe, and visited South Africa, Australia, and New Zealand with this Commission.

From 1903 to 1906 he was employed with the West African Frontier Force in Northern Nigeria, receiving the medal with clasp.

THE LATE MR. T. WRIGHT, M.R.C.V.S.

THE LATE MR. J. A. TODD, M.R.C.V.S.

THE

VETERINARY JOURNAL

Editor:

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor:

GLADSTONE MAYALL M.R.C.V.S.

FEBRUARY, 1918.

Editorials.

OUR LIVELIHOOD.

It is not comforting for us to hear that there is a shortage of live-stock in our country, and that the number of our animals is declining. With no horses and flocks and herds there will no longer be any need for the veterinarian. In the process of reconstruction after the war, the increased breeding of animals must be kept well to the fore, and in season and out of season, we must cry aloud for an earnest consideration of the question. We often grumble about being ignored in fields where our expert knowledge entitles us to stand in the van of progress, but our professional status really depends on the healthy development and increase of the live-stock of the country. To secure the benefits to which our knowledge and experience entitle us, we must be well organised. The days are gone by when single individuals were able to rule the roost, and on every hand we see that by union and co-operation alone bodies of men get their claims and demands satisfied. Individually our status will be determined by the life we lead in a community and by the intelligent interest we display in matters of importance to live-stock owners.

Original Communications.

REPORT ON IXODIC LYMPHANGITIS

(German East Africa Campaign, 1916-17)

Made to the A.D.V.S., Dar-es-Salaam,
By Capt. E. M. Jarvis, S.A.V.C.

Synonyms.—Tick pyæmia.

Definition.—An inoculable disease originating in primary causes through the agency of amblyomma ticks as mechanical carriers. The infective organisms are of telluric origin, and the invasion is usually of mixed micro-organisms. The disease is usually characterised by suppuration, ulceration, and necrosis.

Species affected.—Horses, mules, asses, and more rarely cattle and sheep.

History.—In a consideration of the history, separate and pure infections of the major number of the micro-organisms have been reported as follows :—

1. The Priesz Nocard, discovered in 1892 by Nocard.
2. The Cryptococcus Farciminosus, discovered in 1873 by Revolta.
3. The Bacillus Necrophagus, discovered in 1890 by Bang.
4. The Staphylococcus Pyogenes albus, discovered in 1880 by Ogston.

The first gives rise to a disease known as ulcerous lymphangitis in equines or pseudo-tuberculosis in sheep, the second to epizootic lymphangitis, the third to necrobacillosis, and the fourth to certain pyæmiae and septicæmiae. These organs are ubiquitous the world over. The condition described herein departs in history from each of these.

A disease resembling the one herein described was met with in the Manica District of S. Rhodesia 1888–1904, and puzzled the veterinarians of the day. When the present writer was sent to this District, (1901), he noticed that this disease did not follow the ordinary laws of contagion, but observed the amblyomma ticks caused the first lesions, and the subsequent progress of the disease could be traced to this source.

The second occurrence in the writer's knowledge appeared in this campaign along the Kilossa-Iringa road, where he noticed the causal tick and warned the G.O.C. of the 1st Mounted Brigade of the danger, and the means of prevention. A few cases of infection occurred, but many animals were saved. The disease now cropped up along both main roads to Iringa, the second being from Dodoma.

Geographical Distribution.—One may safely aver that it will occur coincidentally with the distribution of the amblyommoid ticks, *i.e.*, roughly between the tropics in Africa.

Etiology is largely dependent upon locality and existing local infections. One may occasionally get pure infections, but in the majority of cases one can find—

1. Priesz Nocard bacillus.
2. Cryptococcus (or saccharomyces), farciminosis (rarely).
3. Bacillus necrophagus.
4. Staphylococcus pyogenes albus (chiefly in lung lesions in donkeys).
5. A bipolar bacillus 2·5—μ4μ × 0·75—1·0 μ, unnamed, may be adventitious.
6. A coccobacillus 1·5 μ × 1·0 μ, unnamed, may be adventitious.

Having no proper means of cultivation and sterilisation, the growths of the organisms in culture media could not be properly observed.

Toxæmia.—Many of the wounds were tested with blue litmus and showed a strongly acid reaction, and there is little doubt that a powerful toxin is liberated, and is the principal destructive agent.

Clinical Symptoms.—These are of different types, largely dependent on the infective organisms present.

(i) *The Pedal Extremities.*—Lameness first appears. On examination and careful search, either a male "variegatum," with rostrum deeply embedded, can be detected, or a tiny hole seen, which on pressure yields a pin-point of yellow exudate. The part affected is extremely tender to the touch.

In a few hours necrosis begins, and in three days an island of dead tissue exists, which is surrounded by a fissure by about the fifth day. The necrosed area becomes more or less detached and can by traction be removed with a pair of forceps. On examination this dead tissue resembles a large tooth and its root. It is grey in colour and has lost its organised appearance, although it is tough and not friable. Its roots are usually surrounded by a thick yellow pus. The ulceration, unless given early surgical treatment, will be progressive, and involve the whole of the soft cellular tissues of the foot; in others a quittor may form, and the tortuous sinuses will be difficult to follow. The resulting crater when the slough has occurred is extremely angry-looking, and in some cases lesser cavities may be detected, containing a sero-purulent fluid or inspissated pus, at times of a very unpleasant odour. Bacilli of necrosis and Priesz Nocard are mainly present.

(ii) *The Body.*—The primary lesions can be looked for between the fore-arms, on the prepuce, penis, anus, vulva, or tail, as the commonest seats, more infrequently on the belly. In other areas the first stage is not so readily found, when covered by hair or where the integument is hard and tense. The lesion may commence in similar fashion, but rarely extends to such a depth as at the foot. On the softer and more elastic skin a mushroom-like elevation, about the size of a two-shilling piece, forms in a day or two with the tick's rostrum embedded in the centre. About the fifth day the elevation has lost its hair and begins to show a well demarked line of severance. About the tenth day it assumes a dried-up, wart-like appearance, and can be detached by traction and the aid of forceps. Its underside is convex, coated with pus, often with a fœtid odour ; it leaves a crater-like ulcer with lesser cavities branching off, filled with a yellow or faintly brown cheese-like, or inspissated pus. The crater, if not attended to, will frequently spread like a rodent ulcer. From this first elevated lesion a condition of lymphangitis may appear, spreading in the direction of the afferent lymphatics to the gland draining the area. In the Rhodesian outbreak the lymphangitis was always a precursor to the condition of pyæmia, but in G.E. Africa only occurs in about 5 per cent. of cases. The lymphatic vessels in that outbreak never stood out in bold relief, became hard and tense or corded as they do in German East Africa.

The typical course is the appearance of a diffuse swelling, followed by a large abscess developed in the nearest lymphatic gland. The abscess is from the size of an orange to a cocoanut, hard and tense, and remains covered with hair. It is deep-seated, shows very little tendency to point or soften at any particular spot, and if unopened the swelling may gradually subside, rarely bursting open. The contents are like Nestle's condensed milk in appearance, white, viscid, cohesive, and not readily spread on a glass slide. When the abscess has been in existence for some days a considerable quantity will remain semi-adherent to the cavity, and require removal by traction or scraping.

In the typical cases met with in G. E. Africa, the corded lymphatics showed lenticules the size of a walnut with more tendency to point and break. They are never smaller in dimensions and are more regularly placed than in epizootic lymphangitis, do not shed their hair or take on a polished appearance. They usually occur along a straight line. When preserving these characteristics were only seen along the course of the jugular furrow or lymphatics of the neck, pointing out the seat of invasion, either between the angles of the lower jawbones, or in the mane. The lymphatic vessels usually return to normal soon after the lenticular abscesses arise.

On the areas of hard and tense integument no lymphangitis nor large abscess appears. Here the tendency is to spread by sinuses in the deeper skin layers. In the superficial layers the sinus will enlarge to a small abscess which will burst of its own accord as the integumental covering is frail and is easily injured—e.g. when an animal rolls. The cavity is like an ulcer, crater-like, and has invariably one or more small sinuses leading off and opening into other lenticular spaces. In a few days these may become confluent, and a large patch of skin from the size of a five-shilling piece to a dinner plate slough away, leaving an angry, uneven, pitted surface. It spreads and extends under its periphery, the marginal skin being underrun, with further consequent necrosis of the edges. A plentiful yellow seropurulent discharge constantly collects under the free edges of the skin. In long-standing cases and in cases unrelieved by surgical treatment metastic abscesses do frequently occur in the lungs, liver, and spleen. In infections conveyed by ticks near the anus a chain of abscesses may develop in the abdominal lymphatic glands, underneath the bony spine, with the presence of a fistula linking up the abscess with the intestinal lumen into which it discharges. The organisms present, are principally Priesz Nocard in the abscesses in donkeys' lungs complicated with staphylococcus pyogenes albus. In primary lesions the bacillus necrophagus is also found.

(iii) *The Skin Lesion.*—*Dermatitis* would appear to arise as a result of a generalised infection, as it was only noticed in cases where lesions had arisen from tick infection in some localised part of the body. It was only observed at the first rains of the season just before Christmas, 1916. The first appearance is of small, raised, lens-shaped elevations of the size of a small split pea. There is no sign of a pustule, and the lesions are hard and covered with hair associated with a staring coat. In about three days the hair becomes matted together on the elevations as a result of a slight serous exudation. The cutis deadens and in five or six days becomes detached. It is not easily shed, being semi-adherent through the hair still holding to the live portion of the follicle. The connective tissue though necrosed still has considerable tensile strength. It can be removed by traction and a pair of forceps, when a yellow seropurulent fluid is seen attached to the internal face. After removal the lesion of the live body is crater-like and partly cicatrised. Most of the exquamated tissue in nature remains attached for a long period, gradually disappearing as dandruff or scurf. The skin lesions of the hairless parts, nasal bridge, lips, ears, and prepuce, as also the lower extremities, seldom show any seropurulent fluid, and the lesions remain attached like so many small papillomatous growths. These dry and harden and eventually fall off in about a month, with hardly any trace of a scar. In the lower part of the legs if unassisted to desquamate by oleaginous preparations, dirt causes irritation, and the deep-seated lesions of the foot, as described above, arise.

A further reason for arriving at the conclusion that the condition is one of a generalised infection is often borne out by the occurrence of abscesses in the lungs or lymphatic glands, or death intervening as a result of septicæmia and pyæmia. In some of these dermatitis cases ulcerlike lesions may be detected on the mucous membrane of the nasal septum. They are of a size of a threepenny-piece and seldom extend deeply to the septal cartilage. Occasionally a few may be seropurulent and confluent, but are usually dry and show slight inflammatory processes. In all these cases there is a hard swelling in the submaxillary lymphatics with abscess formation, which on incision exudes the condensed milk-like pus. The open abscess takes on an ulcerous appearance and is often of a rodent nature. The organisms found are Priesz Nocard, staphylococcus pyogenes albus, and necrosis organisms.

(iv) *Acute Type.*—Sudden death by a toxæmia in a few hours as a result of septicæmia.

(v) *A Superposed Epizootic Lymphangitic Infection.*—Shows the lumen of the lymphatics of an uneven calibre, greater and more persistent thickening of the walls, abscesses at irregular intervals, forming a chaplet or rosary. The external surface is polished and free of hair, the pus of the consistency of Camembert cheese; there is freer proliferation of the tissues; in fact in many areas, as in the inner cavities of the eye, fungoid excrescences appear. About the head the disease is prone to penetrate the bony structures. A number of cases, particularly in Abyssinian mules, were pure invasions of the cryptococcus farciminosus, but most were complicated with both ulcerous lymphangitis, and necro-bacillosis.

Having had over 1,000 cases of lymphangitis ixodica under treatment in horses, mules, and asses, the following observations were made:—

1. That horses and mules always show external abscesses before their appearance in the internal viscera.

2. That asses seldom show external abscesses; these in the majority of cases appear in the lungs, where they may be unsuspected, until condition is lowered, when they quickly give rise to evidences of pleurisy, dyspnoea, slab-sided appearance over the ribs, depressions in the intercostal spaces, dull sound on percussion, accompanied by a grunt. Coughing is slow, painful, and restrained in volume.

Cases in Masai foals in their infancy have been noted, and the view, that the infection is contracted at this time in a good many cases may be accepted, as one sees quite a number of one- and two-year-old donkeys stunted in growth with harsh coats, of slab-sided appearance and continual "bad doers."

Necro-bacillosis develops at the seat of the primary lesion in asses.

3. The Dermatitis is more inclined to be of the papillomatous variety in mules and donkeys and is confined to the nasal bridge and ears.

4. In the Monica outbreak lymphangitis was always a precursor of pyæmia, but in G. E. Africa it is rarer.

Bovine Lesions are few, and consist of a fungoid elevation of lesser extent and localised to the seats of attachment of the ticks. In rare instances the button-like elevation was seen with necrosis and sloughing; an occasional abscess was detected in the prescapular, postscapular and precrural glands, usually undetectable in life, only coming to view on meat inspection.

Morbid Anatomy.—In cases where the saccharomyces are absent the enlargement of the walls is temporary, with no resultant appreciable thickening of the lumen of the lymphatics. The abscess formations are practically confined to the lymphatic glands, following in unchecked invasions along the afferent channels, the organisms being arrested in successive glands in turn. The cavities caused by accumulations of pus are sinuous and the pus frequently finds its way into the connective tissue between the muscles. In Manica there was seldom much cellulitis around the infected zone, but here it is often acute, hæmorrhagic, and easily bleeds. Feeble attempts to form new tissue are often seen, but the destructive processes are more potent. The surrounding areas show a yellow gelatinous exudate in horses and mules, and a white gelatinous one in asses. In acute cases metastasis occurs with the appearance of the abscesses in the lungs in the mediastinal glands, localised purulent foci under the pleura, more rarely in the liver, and still less frequently in the spleen and kidneys. A chain of abscesses from a primary seat around the anus is occasionally seen under the vertebral region. To sum up, abscesses may be expected to appear along the courses of the afferent lymphatics, draining the part where the primary infection takes place.

Dissemination of the Virus.—In Southern Rhodesia the disease was almost entirely spread and mechanically conveyed by the amblyomma variegata. On the disappearance of the tick—brought about by hand picking and dipping—the disease entirely disappeared, and has not been seen since the year 1904. Prior to the protective measures being in vogue—*i.e.*, 1888-1901—the disease was on the increase, and was so virulent that it was impossible to keep horses and mules in the Manica district without contracting the disease. Destruction of infected stock by earlier veterinarians proved abortive.

After having had the opportunity of examining over 1,000 cases on the march and in hospital, it may be accepted, speaking for German East Africa, that—

(*a*) Not less than 75 per cent. contract the disease through the agency of amblyommoid ticks.

(*b*) The second means of dissemination is derived from the primary wounds caused by the amblyommæ.

(*c*) Twenty per cent. are contracted through the agency of stomoxys by settling on infected wounds, deriving the causal organisms therefrom, fly away with infected probosces to stab otherwise aseptic wounds with extraneous vitiation.

(*d*) The remaining 5 per cent. are directly inoculable through the entry of dirt organisms by means of thorns, nails, and by gravity into deep fissures like cracked heels or deeply lacerated wounds.

At first sight it may well be conjectured how one class of tick should be so pernicious and not another. The explanation lies—

(*a*) In the length of the rostrum, enabling the tick to penetrate through the cutis to the connective tissue.

(*b*) In travelling along the ground this class of tick keeps its rostrum pendulous and so scoops up the virus off contaminated ground.

(*c*) The polyandrous habit aggravates the lesion.

(*d*) The tick has considerable longevity, and has the opportunity of leaving an infected host and attaching itself to another. The tick comes away, as a rule, when necrosis has set in, and looks for healthy tissue in a second host.

Stomoxys and tabanidæ have been observed to infect unabraded tissue by direct infection, through the agency of their probosces penetrating to deep tissue; like the aforementioned ticks Muscids undoubtedly do play a part in carrying infection, but rarely, though, as they are unable, as a rule, to do more than settle on parts exposed to ærobic conditions. The long mouth-parts are just the instruments to plant anærobic organisms into media that suit them, the tiny sinuses caused being sealed by a serous or sanguinary clot and so closed to the entrance of air.

(*e*) Tick birds are no doubt also mechanical carriers as they peck at the open wounds and go from one animal to another.

Prognosis is favourable whilst the infection is superficial, and treatment can be applied to destroy the causal organisms. It is unfavourable when the infection is deep seated and penetration has taken place into sheaths, bursæ or osseous tissue. Destruction is then the most economical; 60 per cent. are temporary, 25 per cent. prolonged, and 15 per cent. incurable, the latter chiefly invasions of the lungs and other internal organs.

Re-occurrence.—In the experience gained in South Rhodesia the farmers stated that the disease re-occurred. The writer in all cases that came to his notice found that the external lesions were the result of a fresh invasion by ticks. Further, the writer knew cases of animals (recovered) ten years after the ticks had vanished and which never showed another lesion.

Surgical.—(*a*) Open up the wound, making deep incisions to allow free draininge and exposure to ærobic conditions.

(*b*) Remove all necrotic tissue by traction, excision, and scraping. It is most important to do this thoroughly.

(*c*) Remove all pendulous and underrun tissue like skin, fungoid, new growths, etc., as the organisms propagate thereunder and the lesions spread.

(*d*) When opening an abscess remove part of the lips of the wound and make a crater to allow of thorough antisepsis and a clear view to the interior so that lesser sinuses and pockets can be brought to view and properly cleansed.

Antisepsis.—The ordinarily used antiseptics like boracic acid, chloride of lime, carbonic acid, coal tar derivates, solutions and tincture of iodine were of little avail. Inorganic salts, like sulphates of copper, zinc, etc., which form a dry scab at the base, and an albuminate, only served as a covering, creating a more or less anaerobic condition without destroying the toxine and its necrotic effect.

The first successful treatment consisted of

Iodine Resub	1 part
Ac. Carbol.	3 parts

and was applied with a feather or brush and carefully inserted into fissures and depressions.

For use on sinuses and fistulæ the following lotion was made use of:—

Hydrarg. Biniodidi Rubri	℥i
Pot. Iodide	℥i
Aquæ	Oi

The shortage of iodine and its compounds, owing to war conditions, necessitated the finding of a substitute.

(*a*)	Powdered Calomel.	
(*b*)	Acid Arseniosum	2 parts
	Hydrarg. Perchlor	1 part
	Farinæ Tritici	20 parts

were both tried, when drugs ran short "in the field," with some success in the more superficial cases. The quittor cases and deeper lesions had to be given up as hopeless, until the author tested the wounds with blue litmus paper and found there was a strong acid reaction in nearly every case. He determined to neutralise the destructive toxine with a solution having strong penetrative power. Liq. ammon. fortiss suggested itself. Accordingly solutions were made up as follows:—

1. Ammonised vehicles carrying iodine.

These gave excellent results, but again quantities of iodine were unobtainable. It was thought that possibly an ammoniated solution of an inorganic salt might be effective, and

2. Cupri Sulph. ℥j.
   Ammon. Carb. ʒx
   Aquæ Oj

was tried. A drachm of liq. ammon. fort. was added to clear the solution and give an excess of free ammonia. This preparation acted like magic as compared to anything else used. Cases which had formerly to be destroyed are now cured. A cure is effected in a third of the time formerly taken. Better results were unlikely, and it is now practically the only dressing used.

It has other merits:

(*a*) It is repellent to both tick birds and flies.
(*b*) It dries up the fluid discharges.
(*c*) Is economical in price and saves covering with wool, etc., in slighter cases.
(*d*) Has antitoxic properties.

Medicinal.—Administrations of the iodides of mercury and arsenic were tried with a small measure of success, but in view of iodine problem are hardly sufficiently beneficial to warrant their continuation.

Prophylaxis.—(*a*) In Southern Rhodesia the writer found from extended experience that if ticks were pulled off within twelve hours no infection resulted; in other words, the infection only took place when the rostrum penetrated to the sub-connective tissue. The tick burrows but slowly, and takes 18 hours to accomplish his object.

(*b*) Again, even up to 24 hours the disease could be prevented by pulling the ticks off (rostrum and all), squeezing the tiny sinus, which exudes a serous discharge, and painting with iodised phenol 1:4. This method was eminently successful, and all the B.S.A. police were supplied with a small bottle and brush, and not one case occurred in the force after its practical application.

In this campaign, on the march, the first principle was applied with a good measure of success in the 4th S.A. Horse. The second measure could not be applied, as drugs were unobtainable owing to campaign conditions.

The two above are the only practical ones "in the field." In civil life the following can be adopted, but it is a lengthy course, occupying a few years.

(*c*) The eradication of the ticks by dipping and hand picking.

Females are few, and so large as to be readily seen and destroyed before they have a chance to lay their eggs.

(*d*) The destruction of flies by poison and destruction of refuse to prevent formation of breeding grounds. It should be here remarked that amblyommoid tick eradication has been completely successful in S. Rhodesia, and since 1904 not a single case has occurred. The equine population has grown from practically *nil* to thousands. Stomoxys are present, but have no chance of procuring the virus from the tick infected wounds.

(*e*) In veterinary hospitals, stables, regimental lines, and transport columns it is recommended that malignantly infected wounds should be segregated, as for contagious diseases, and all such cases kept a good distance from the other patients, for fear of dissemination by flies. All discharging wounds should be kept covered with generous pads of antiseptic wool, tow, and bandages.

It may be asked how one is to discriminate. The following course is adopted here :—

Isolate

(1) All cases of tick lesions.
(2) All ophthalmic cases.
(3) All cases with aeropurulent discharges.
(4) All necrotic wounds.
(5) All wounds into caseous tissue.
(6) All nasal discharges.

When in doubt, examine microscopically. Until the veterinary hospital was equipped with the necessary wards, there is no doubt that patients above suspicion became infected through the agency of flies.

Vaccines.—Major Montgomery, E.A.V.C., has a vaccine for the Preisz Nocard bacillus.

Differential Diagnosis.—As pointed out above, the disease is a mixed infection in German East Africa. The microscope should be used in cases of doubt. Mallein can be used to differentiate from a glanders infection.

Seasonal Occurrence.—There are few adult amblyomma in the dry season or winter months ; cases of infection are then rare. Prevalence, September–May.

NOTES ON THE TREATMENT OF EQUINE SPECIFIC OPHTHALMIA.

By MAJOR F. CHAMBERS, F.R.C.V.S., A.V.C.

SINCE writing on the above subject,* when I advocated the injections of Lugols solution into the supra-orbital fat, I have had a further opportunity of investigating this peculiar affection. Laboratory methods have, of necessity, been rough and the amount of available material has been small.

Specific ophthalmia, as met with amongst Army horses, is of two types :—

(*a*) The real or specific ophthalmia, characterised by acute pain, photophobia, an acute inflammation of the outer rim of the cornea, which gradually extends to the centre, a profusion of highly injected vessels into the cornea itself, and a gradual infection of and disorganisation of the whole eye. There is always a rise in temperature.

(*b*) A spurious or traumatic ophthalmia characterised by an acute inflammation of the cornea with seldom other sequelæ.

The former may, if not treated immediately, end by pus formation in the interior of the eye. If the attack is periodic it belongs to the first class.

The second class, which is most common where wholesale dipping of animals in calcium sulphide solutions is in practice, is due, I am inclined to believe, to the constant immersion of these animals in this agent. My suspicions were directed in this channel during the summer of 1917, when I was able to observe the results in a formation which were dipping their horses at frequent and regular intervals in a solution of calcium sulphide. Before dipping specific ophthalmia was almost unknown, but after dipping had been in progress for some time a form of ophthalmia appeared, and a large number of animals became affected. I advised the injection of Lugols solution, knowing full well the excellent results that I had obtained in the treatment of specific ophthalmia when investigating this disease in 1914. To my surprise I was informed that the treatment in these cases did little to effect a cure.

The second link in the evidence was forged when experimenting with the use of sulphurous anhydride gas in the treatment of mange. A certain amount of gas always escapes from the collarette from the leeward side and causes a distinct corneitis with acute pain. This would disappear in two days, but after several fumigations a kind of ophthalmia appeared which was troublesome and did not react to Lugols solution. Once cured it did not reappear, although all these cases were kept six weeks under observation. If this had been true specific ophthalmia it would have reappeared in one or more of these cases, as Lugols solution was only used in a few of these cases. Calcium sulphide solution, as prepared and used in the Army, may be said to contain :—

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* Journal of Comp. Path. and Therapeutics. Vol. xxx, p. 136.

Calcium, stated as CaO	0·937	per cent.
Total sulphur	1·972	,, ,,
Total sulphide sulphur	1·517	,, ,,
Sulphur, as thiosulphate	9·430	,, ,,
Sulphur as sulphate and sulphite ..	0·025	,, ,,
CaO, as sulphide and polysolphide ..	0·514	,, ,,
CaO, as thiosulphate	0·376	,, ,,
CaO, as sulphate and sulphite ..	0·044	,, ,,

The pentasulphide is the most dominant sulphide, the occurrence of sulphur in considerable excess of that required is the rule rather than the exception. The formula of the mixed dip would be :—

$$3\ Ca\ (OH)^2+12S=2\ CaS_5+Ca_2So_3+3\ H_2O.$$

According to the equation we should have one-third of the lime and one-sixth of the sulphur passing into this sulphide. After an animal has been dipped in freshly-prepared dip, oxidation takes place and in a short time practically all the pentasulphide is transformed into thiosulphate. Oxidation also takes place in the tank to a considerable degree. After being in use some days the amount of thiosulphate present in the tank must be considerable. The action of calcium sulphide solution depends upon the presence of calcium pentasulphide. Calcium thiosulphate has no curative properties, but it is a very powefrul irritant. It is this salt that, in my opinion, causes this form of ophthalmia. There is no means of standardising a calcium sulphide dip, which is in constant use similar to the method which can be used with arsenical solutions.

ADENOMA OF THE KIDNEY IN A HORSE.

By LIEUT. J. J. AVESTON, M.R.C.V.S., A.V.C.

THE subject was a 7-year-old light draught gelding, admitted to hospital on October 9th, 1917, said to be suffering from debility.

On examination it was found that the horse was passing blood-stained urine, which, on analysis, showed that albumin was present in considerable amount. The pulse and temperature were normal, but the visible mucous membranes were very pale and anæmic in appearance. Rectal examination revealed nothing abnormal.

On the day of admittance to hospital the mallein test was applied as a routine procedure, but no reaction followed. Although the appetite was good and remained so throughout, the patient gradually became more debilitated, and on November 7th, 1917, after a month's sojourn in hospital, he was destroyed. During the whole of that month the horse showed no signs of pain, or even discomfort. The urine remained blood-stained throughout.

The *post-mortem* revealed an enormously enlarged right kidney; its weight being 60¾ lb. It had actually extended over to left side, and enveloped the left kidney, which was normal. Notwithstanding the size of the tumour, an elliptical portion of the kidney remained, which appeared on section to be normal in structure.

A piece of the diseased organ was submitted for microscopical examination to Sir John McFadyean, who pronounced it to be composed mainly of adenomatous tissue.

BACTERIAL PYELONEPHRITIS IN A COW.

By G. GAIR, M.R.C.V.S.,
Conon Bridge.

BACTERIAL PYELONEPHRITIS is an inflammation of the kidneys usually of a chronic nature, and involving the renal pelvis and lower urinary passages. A variety of organisms may be found in these affections, such as staphylococci, streptococci, etc. These are all capable singly, or as a mixed infection, of causing grave pathological changes in the renal tissues.

The organism more frequently concerned in this affection in cattle, however, is the corynobacillus. In fact, with the exception of a few isolated cases in which the organism was found in horses, it is almost exclusively found in the urinary organs of cattle.

Until lately the disease was included among the ordinary purulent pyelonephrites, but is now known to be caused by a special organism, alone, or more frequently, in association with other pathogenic bacteria. The etiology and pathology of the disease have been studied by various writers, who all agree as to its polybacterial nature. It is more frequently observed in cows after calving, most probably injury to the genital passages favouring infection.

Lately I was consulted in regard to a cow which for nearly two months previously showed turbidity in the urine, and was believed by the owner to be affected with red water. From the turbid and muddy condition of the urine I suspected bacterial infection of kidneys and lower genital tract. On making a direct smear from the urine without centrifuging, and staining with Gram, I found the causative organism to be the corynobacillus. The organism is Gram positive, non-motile, 2µ to 4µ long by about 0·5µ thick, and is aerobic. They are irregular in length and form, and some appear as short rods, while others appear larger, staining more deeply at polar ends and middle. Some show as elongated thread-like forms, and others are club-shaped, while budding and branching are also observed. They stain with the ordinary dyes, weak carbol-fuchsin, methylene blue, and carbol thionin blue.

In stained smears directly from urine a plain clumping of the bacilli is noticed. This clumping is well marked and is a special feature in the diagnosis of the disease. The picture is not unlike that seen in agglutination of the bacilli in typhoid when the clumping is complete. In stained smears from growth on ordinary agar the clumping is not observed. To eliminate the possibility of B. coli being present, some of the urine was plated on MacConkey's neutral red lactose agar, but no growth was obtained. On ordinary agar, however, numerous colonies were formed. Besides the corynobacillus, a number of other organisms were found, including staphylococci, a few streptococci, long and short chains, and pus cells containing bacteria and epithelium cells. It is of great value finding phagocytised bacteria in pus cells of the Gram stained smears.

These indicate the causative organism which shows so very well in the beginning of these affections. Only on a microscopical examination can a positive diagnosis be obtained, and a differentiation made between other forms of nephritis and tuberculosis of the urinary tract.

In the examination of a large number of urine samples, both human and animal, I find the following means of examination of value: In centrifuging a urine avoid as much of the supernatant urine as possible, as its admixture on the smear makes staining less satisfactory. Gram's method counterstained with Bismarck brown is most satisfactory. A loopful of egg albumen or blood serum to about twice that quantity of urinary sediment gives good results. Pathological urine has enough albumen to fix smear. Hæmatoxylin and eosin are excellent for epithelial cells, and Gram's stain for bacteria. By putting a little sediment on a glass slide with a ring of vaseline round it, adding a drop of Gram's iodine and using cover glass, we see the cells stained beautifully when examined with a $\frac{2}{3}$-inch objective.

Turbidity of urine, although most often due to bacterial contamination, may also be caused by phosphates or amorphous urates. Formalin and camphor are useful as preservatives for urinary specimens.

Since several years I have had an opportunity of examining a large number of pathological specimens of both human and animal urine, and it appears to me that the most important bacterial infections of a hæmatogenous nature are, in order of their relative frequency: Colon bacillus, staphylococci, streptococci, gonococci, proteus, typhoid, and paratyphoid. Renal tuberculosis, for instance, is more frequently of a hæmatogenous nature than of an ascending infectious nature.

This particular case in the cow was treated three times daily for several weeks with boric acid in gruel, and subsequently an occasional dose of turpentine was given. Microscopical examinations of the urine were made at various intervals. The urine gradually became much clearer in colour, the organisms diminishing appreciably in number, but yet retaining the special feature of clumping, although the clumps were smaller in number and in size. Eventually the urine assumed its normal condition, the appetite improved, and after a period of over three months' illness the cow regained her former state of health.

BLOODY URINE.

By C. MAYALL, M.R.C.V.S.

In current contemporary periodicals there has recently been discussion on bloody urine. From a consultation of available literature I find that voidance of red blood corpuscles in the urine occurs in all animals. Distinct hemorrhages occur in the urinary tract by rupture of blood vessels. Hœmorrhages from the kidney arise through leakage from its finer vessels and more or less proportionate mixture of blood with the urine. Bleeding from the kidneys occurs through wounds, crushing and bruising, and is an accompanying symptom in purulent inflammation and cancer and other tumours of the kidneys as well as at times in acute infectious ailments.

Bleedings from the bladder, ureters and pelvis of the kidney occur in cystic and renal calculi, inflammations, catarrh and tumours of the bladder. In these cases vermiform or clotted deposits of blood form or the last emptied urine is blood-stained.

Hœmorrhage from the urethra in male animals, or from the penis, occurs from inflammation and injuries, and is characterised by dribbling of blood or the voidance of thread-like clots.

Sporadic hœmaturia occurs chiefly in cattle, and may arise from the kidneys or bladder. It may be an accompanying symptom of inflammation of the kidneys, and may arise where cattle graze on shrubs or in woods, or be an individual idiosyncrasy.

Causes.—Pasturing in woods, and the eating of irritant plants, ranunculacæ, anemone, spurge, dog's-mercury, broom, clematis, water pepper (polygonum hydropiper), whortleberry root, the resinous leaf buds of alders, oaks, firs, and pines. In misuse of diuretic remedies (juniper berries, cantharides) as well as in feeding smut and mould-spoilt food. It may also occur as a result of intensive feeding or in a quick change from poor to rich food.

Prognosis.—Favourable in early stage, unfavourable later on and where complications have arisen.

Treatment.—Mucilaginous drinks and milk. Laxative salts. Alum, perchloride of iron, sugar of lead. In constipation, calomel.

THE ASPERGILLIOSIS OF .BIRDS, MAN, AND ANIMALS. A RESUME.

BY FRED C. MAHON, M.R.C.V.S.,
Chiswick, W.

KOLLJAR divides pseudo-tuberculosis into two groups: (1) Due to bacterial origin; (2) of mycotic etiology—these being produced by aspergillii.

At a meeting of the Pathological Society of London, on February 21st, 1899, the President (Dr. Payne) in the chair, the discussion on pseudo-tuberculosis, which was opened by Dr. G. Sims Woodhead, the latter gentleman called attention to a case described by Professor Bayne, of Liverpool, which this writer had properly described as aspergillos-pseudo-tuberculosis, and this was in agreement with a similar condition so described by Kolljar. Dr. Washbourn, referring further to pseudo-tuberculosis, said: "The term was used to denote diseases which resembled tuberculosis in 'morbid anatomy,' but which were caused by other organisms than the bacilli of tuberculosis. Of late," he added, "a large number of such cases had been described by various observers. There were many organisms which produced similar anatomical lesions to those produced by the tubercle-bacillus. These organisms were, however, of a highly different character."

There were bacilli, such as the bacillus pseudo-tuberculosis, giving rise to caseating tubercles in many animals, and (*b*) bacillus pseudo-tuberculosis murium, causing caseating tubercles in mice, and the bacillus pseudo-tuberculosis liquefaciens, causing tuberculosis in the human subject, with similar lesions. In the rabbit there were various kinds of streptothrix, one such being described by Dr. Flexner in the human subject. There were also, again, organisms which did not belong to the class "bacteria," but were a form of mould, known by the term "aspergillii," which have been described as causing a tuberculous lesion in the lungs of the human subject, and also nematode parasites, producing tubercles consisting of giant cells, also epithelioid cells in the lungs of cats and the kidney of the dog, etc.

Dr. Woods Hutchinson had several specimens of the conditions, which would come under the heading of pseudo-tuberculosis, which he had obtained from the Zoological Gardens. One was a lung in which the lesion showed was due to an "aspergillus" taken from a trumpeter bird, and he had met with similar specimens in ducks and parrots. It did not, however, in them appear to be of a highly toxic character.

So far back as 1809 the aspergillii came frequently under the notice of Dr. Woods Hutchinson, M.D., Professor of Comparative Pathology, U.S.A. This observer said, *re* distribution of tubercle in various species of animals: "It may perhaps be worth adding that although the lung proper of birds is comparatively seldom the seat of disease, the other parts of the respiratory tract, such as the great air sacs, are much more so. They are extremely prone to be attacked by pathogenic moulds, which form a thick layer on their inner surfaces, often making a complete cast of half of their cavity, and in some cases filling it up solidly, a thick white exudate not unlike cream-cheese being poured out from the walls, and upon this an abundant crop of a whitish-green or black in colour forms."

On May 13th, 1916, W. Scott, F.R.C.V.S., Bridgwater, published a most interesting report entitled "The Aspergillus Fumigatus Infecting the Nasal Mucosæ of Young Foals." Reference to such reports will tend to make the subject a theme of further study, and elicit some further facts, not only relative to its distribution, but the serious pathological changes invasion by the aspergillus can effect.

The aspergillioses of birds have of late years occupied the attention of many, and the occurrence of these organisms in one or other species of animals, and in man, induces my observations relative to the subject as a whole, by way of review. I encountered a case in 1916 in a young female swan which, after a short period of indisposition, according to her owner, suddenly succumbed. A *post-mortem* examination (microscopical) revealed the presence of a mould which, cultivated on potato, is identical with that in Mr Scott's contribution.

A. de Jong (Centralbl. f. Bakt., u.s.w.) in *Veterinary Record*, January 25, 1913, alluding to canaries, adds: "The results of my examinations of sick and dead canaries, which came from breeding establishments of a municipality in the Netherlands—after enumerating the history of the same in which the disease had generally been regarded as contagious—I noted the difficulty of respiration as a chief symptom, and that the affected birds bore fresh air and cold better than a sojourn in a heated, ill-ventilated room. Autopsy revealed small, whitish-yellow, crusty deposits at the entrance to the larynx, in the trachea, and at its bifurcation yellowish masses, with caseous centres."

Dr. Washbourn, again referring to pseudo-tuberculosis, said this term was used to denote diseases which resembled tuberculosis in morbid anatomy. One thing seems clear: naked-eye observations as well as microscopical investigation, and in doubtful cases a series of cultivations, is absolutely necessary to determine what affection we are encountering.

D. A. de Jong, on examining several birds (living) found yellowish-white crusty deposits upon the tongue and palate. Yellowish white caseous centres of varying size were also found in the lungs and pleura, and occasionally on the peritoneum, also in the liver.

We thus see the mould is fairly wide in its distribution, and in the number of organs it attacks. Death occurs in consequence of the violent dyspnœa. The chief micro-organisms isolated were diplococci and the mould fungus "aspergillus fumigatus."

The diplococci had no pathogenic effect either upon canaries or upon the ordinary animals of the laboratory. The moulds, however, proved highly pathogenic for rabbits; on the other hand, attempts to infect canaries by inhalation of powdered and very pathogenic spores invariably failed. In the latter connection the author mentions that Schutz, in 1884, was able to infect some canaries in this manner, but he believes that other means of infection came into the question in this disease. In the case now under report he explains the origin of the illness from the unhygienic conditions under which the birds were kept, viz., in darkness, and narrow cages. He believes that the latter are really answerable for the pathogenic effect of the infection, which he presumes arose first from inhalation.

In support of this conception the author states that he succeeded in improving the condition of the affected birds by removing the unhygienic surroundings. After thorough disinfection of the cages and rooms with creolin, the introduction of fresh air, and avoidance of the administration of dusty or mouldy food (which he effected by scalding the food), improvement followed.

Pfeiler of Bromberg, commenting on the above, adds that he has occasionally seen similar anatomical and bacteriological conditions in the dissection of so-called "short-winded" birds. Birds affected with this disease usually continue to live for some considerable time in "good spirits," but are often affected with hoarseness, totally discontinue singing. According to Pfeiler's knowledge, this disease, which in Germany is specially observed amongst well-bred singing canaries of both sexes, is not regarded as infectious. That a cure cannot be attributable to better hygienic conditions is clear, Pfeiler thinks, to every one acquainted with the circumstances, for German canaries, in most breeding establishments, are kept unhygienically. —(*Berliner Tier. Woch.*)

Avian Aspergilliosis: *Aged Swan.*—An aged female swan which had died suddenly was taken by the owner from a pond at Shirley, near

Southampton, in the spring of 1916, and the lesions were principally confined to lungs and liver. Microscopic examination of the bodies, and cultivations as laid down in the translation by "W. R. C.," *Veterinary News*, March 18, 1911, were carried out. The work to me was new, so far as seeking for a further agent than tuberculosis in the swan was concerned, and induces my placing this note on record, as a new era seems to have dawned for practitioners who devote time and labour to elucidating facts in connection with bird diseases.

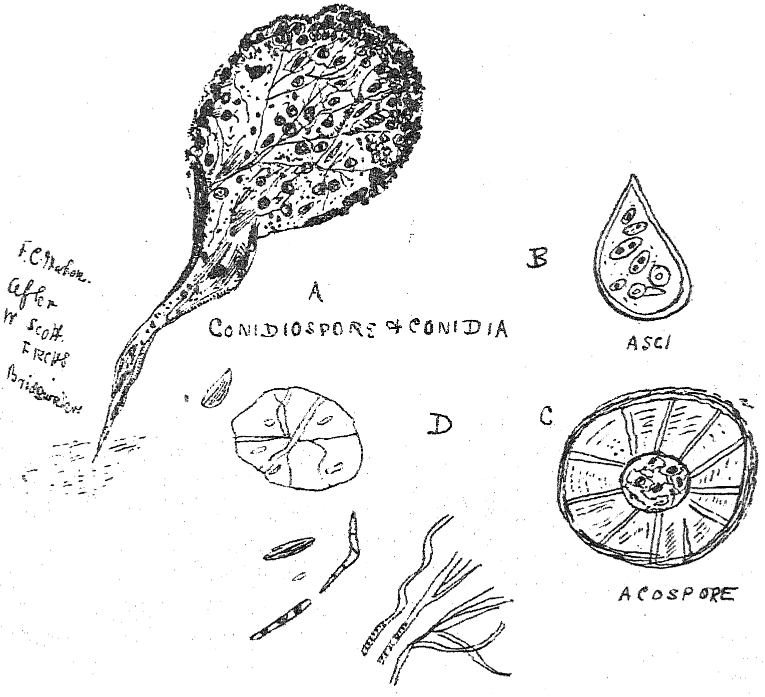
To Mr. Henry Gray, M.R.C.V.S., of Kensington, whose valuable records and investigations are well known—or should be—in this direction, I think we as English veterinarians owe much; also to our American cousins, who have produced many fine works dealing with the subject.

Cage birds—many of them valuable to owners not only for their rarity but for the trouble and expense in procuring the same from remote corners of the globe—the prize strains of fowls, etc., kept for show purposes, likewise those for table consumption, offer a field of exploration, and new ground for the rising generation of practitioners.

History of Swan.—Briefly, in this case we had an inciting cause or condition inducing propagation of a disease, etc., by the long, drawn-out terrible winter of 1915-16 in Hampshire and the southern counties. The female bird had been apparently in fair health, so far as the owner's judgment went, although at times dull and off-feed, with hoarseness and, as owner said, stuffiness, and attempts to get rid of some offending body. One marked feature of the investigation was the number of starlings—usually birds which can withstand cold—being found dead on and around these waters. A few I selected showed the lesions—some pronounced, others less so—of the "pseudo tuberculosis aspergilliosis," and I am wondering whether the one cause at work affected the swan as well, or whether the water was the source of contagion, or rank weeds around the pond, by harbouring the mould in various stages of development. Another fact which must not be overlooked: oats, bran, bread, etc., were given at times by owner, being thrown on the grass around the pond, also by neighbours, with additional provender of a medley character.

The appearances *post-mortem* of the swan, especially the deposits at the bifurcation of trachea into larger bronchi, the deposits in air-sacs. the tubercles and deposits on liver and its capsule, betoken something out of the common, and, being interested in reading Mr. W. Scott's account of the invasion of the nasal mucosæ by the aspergillus in fowls, led to further research. I elicited further facts from the owner, viz., that the swan often appeared, to quote his remarks, "bronchial," and further she had for some weeks been gradually losing flesh. She was emaciated beyond words on making the autopsy. I searched for intestinal and tracheal parasites, but found none; for tumours, for pyæmic, etc., abscesses, but with similar result.

Re Cherelein's find, as translated by "W. R. C.," I experimented, as did he, with the fibrinous material from the air-sacs of the lungs, and found a mycelium present; also in the pseudo-tubercular growths in lungs and liver upon gelose and potato, and found the aspergillus



Scattered Growths of
Various Kinds among
the "Aspergilli"

F. C. Mahon

present. The appearance of the growths under the microscope was identical with Mr. W. Scott's drawing in the fowl, which I take the liberty of re-producing.

The disease "aspergillus fumigatus" therefore appears to be met with other than in cage-birds or horses, for rabbits, swans, geese, pheasants, and starlings, etc., fall victims to its invasion. It thus appears fairly universal, and perhaps has in the past accounted for many deaths attributable to poisons accidentally picked up, or maliciously given, as sole factors in producing a large death roll when other causes—among them, for example, this active agent—are at work.

I should feel obliged by any reader giving me any standard work in which the "aspergillus fumigatus" is broadly treated, for future study and reference, and as space forbids must draw these notes to a conclusion.

POISONING BY MOULDY FODDER.

BY PROFESSORS ALBRECHT AND HARZ, MUNICH.

In a dairy of nine cows and a heifer the whole of the herd were suddenly attacked with inability to masticate or swallow their food, or, after twenty-four hours, to drink. Respiration was difficult and painful, and the limbs cold. At first there was diarrhœa, afterwards constipation. The temperature varied from 38 deg. to 38·9 deg. C. The heifer and three cows were slaughtered on the seventh day; the others recovered.

Post-Mortem Examination.—On *post-mortem* examination the mucous membrane of the abomasum was of a deep red colour, and contained a quantity of grey-coloured mucus. The small intestine, particularly the duodenum, was also congested and covered with erosions, the contents containing a number of blood-clots. The hay was suspected, and a sample sent to Munich Veterinary School for examination.

Cultivation experiments showed the presence of:—Thichothecium (cephalothecium) roseum; mucor racemosus; chortomium viridé; aspergillus repens; and aspergillus ochraceus.

Experiments. Two goats were inoculated with both species of aspergillus, without any effect, and the authors suppose, therefore, that this animal is immune. The authors consider that both the aspergilii possess very virulent properties in the ox. (Wochenschrift fur Tierheilkunde, Sept. 22, 29; Oct. 6, 1908, pp. 431, 449, 461).

(Cherelein's find in avian aspergillosis, to which it gives the name of pseudo-tuberculosis, to growths which occur in the liver of turkeys, about the size of a pea, whitish in colour, and analogous to tubercular lesions. His microscopical examination, after scrapings stained by "Zeehl's method," showed no acid-fast bacilli. Examination of a small portion of tumour from the liver revealed a mycelial filament, devoid of spores. Cultures upon potato and gelose produced negative results. In bouillon they remained sterile).

Histological examination showed the lesions to be tuberculous, the centre of which was constituted by a filling of mycelium, and the periphery by a ring of epithelioid cells. They were, therefore, pseudo-tubercular in character, and of mycotic origin, the causal agent of which was probably the aspergillus.

Fumigatus. The translator of Cherelein's contribution, W. R. C., adds : " The well-known similarity to the naked eye of the lesions of aspergillus and tuberculosis renders it very possible that the former, at least in birds, in which it has hitherto been chiefly found, is really more common than is generally supposed.''

Translations.

THE HORSE LAZARET, ITS SIGNIFICANCE, DEVELOPMENT AND PRESENT POSITION.

By WILHELM RODE, of the Hanover Veterinary School.

(1) Veterinary Service in the Field during the First Months of War.

Rode only thinks regretfully of his veterinary activities at the beginning of the War, for these consisted of the treatment of slightly ailing or wounded horses, whilst those unable to march in the quick advance of the army were simply killed or left to their unhappy fate. As a result of failure or almost complete lack of due foresight, gigantic losses occurred which not only caused great financial damage, but irreparable injury to a good nucleus of horse material. The reputation of the Veterinary Officers' Corps, as a result of faulty preparation and niggardly treatment of the whole veterinary organisation, suffered severely. It was soon recognised, however, that to remedy this unfortunate state of affairs the providing of horse collecting stations and horse lazarets, as well as a thorough reorganisation of the army veterinary affairs, was absolutely essential. In numerous letters from the field and publications in the lay press a demand for improvement was prominently urged.

(2) What is the Object of a Horse Lazaret, and Wherein Lies its Advantage ?

The chief function of a horse lazaret consists in the taking in and care of sick, wounded, and over-worked horses behind the front. By this means the marching troops are relieved and a better and more thorough treatment of sick animals effected, because sufficient stores of remedies and instruments are available, and a fixed control can be exercised by a veterinary and responsible personnel. Whilst in troops on the march a separation of horses with infectious illnesses is impossible—as the great spread of mange and glanders in the East has shown—yet in the lazarets suitable measures can be taken. For the eradication of transmissible infectious diseases the horse lazaret is of supreme importance. This must, however, be completely separated from the depots if a fresh relay of horses is supplied from the depots to the troops. These horses must, as far as possible, be free from disease, which, where the depot is in contact with the lazaret, is impossible to accomplish. The lazaret furnishes the veterinarian with a wide and excellent field of work, in which every ounce of his ability can be used in the interest of the State and for the cure and benefit of suffering horses. Many company veterinary surgeons who find too little to do among a column of 150 horses, because the worst cases are not treated there, can be better employed in a horse lazaret.

(3) DEVELOPMENT OF THE HORSE LAZARET.

The veterinary service in previous wars played a very subordinate part. One prominent Prussian in the Franco-German War, 1870-1871, held that a good shoeing-smith was of more value than a veterinary surgeon. Schreiber, in an official report at this time, recommended the establishment of lazarets, but got little support. Before the present war the literature relating to the military duties of the veterinary surgeon was very scant. Heuss called attention to the great importance of horse lazarets and collecting places, and Potschke was the first to establish horse collecting stations (which were the first beginnings of the lazarets) at the great autumn manœuvres. The good results obtained there led to their introduction throughout the Army. In February, 1915, the Minister of War ordered the general introduction of horse lazarets. For every corps and every military inspection one to three lazarets were provided, served by a veterinary officer experienced in surgery and infectious diseases. Severely ill horses were put in the stationary lazaret, and in this way a separation of lazaret and depot was brought about. Cured horses must be restored to their original unit. Thus the necessity of the horse lazaret was established, and in May, 1915, the proportion of lazarets for horse depots to the proved strength was fixed. The disappointment was great, however, as now many of the veterinary officers attached to the lazaret fell under the control of an officer as commander who exercised military authority, and was responsible for the maintenance of discipline, whilst the veterinary officer was only occupied with the veterinary technical service. In spite of this personal side, official recognition was a great advance in the development of the lazarets, which were now plentifully supplied with drugs and instruments.

In most of the field this plan worked smoothly, but it fell to pieces in the great forward march into Poland in 1915, because the number of lazarets (one lazaret to one corps) and their mobility were deficient

In June, 1916, changes and new regulations were brought about. Besides the horse-collecting stations, division, corps, camp, or base, and home horse lazarets were formed.

The horse-collecting stations in their present form are only thought of in connection with a war of movement, and are formed by the mobile lazarets. They comprise one veterinary surgeon, one subordinate officer and fifteen men, a horse transport wagon, a store wagon with the necessary effects, food, veterinary medicine chest, and a chest filled with bandages. The horse-collecting depots of the division and corps lazarets furnish the connecting link between the troops and the lazarets. They come directly behind the marching troops, take away sick horses, carry out first treatment, and evacuate them to the proper lazaret.

Each division has 1 to 3 horse lazarets and under special conditions more. They remain 15 to 20 kilometres behind the front, and evacuate at opportune times all severely injured horses to suitable camp or base lazarets in the camping area, or to the advanced collecting places. At every camping place in the line of communications there are at least 1–6 movable horse lazarets which are occupied by those horses whose cure will take some months. The immobile home horse lazarets take in horses unfit for war or such as in their cure will exceed three months. With a stock of 150 patients to every three horses there is an attendant under the supervision of a lieutenant and lance-corporal, one veterinary major or staff veterinary surgeon as technical director, and one chief veterinary surgeon or veterinary surgeon. When numbers increase, there are one lieutenant and ten men to thirty horses, and one veterinarian from the troops is in command of the lazaret. The veterinary health wagon contains all veterinary requirements furnished on modern lines. One horse transport wagon is also supplied.

Construction.—Each lazaret comprises (1) a reception place with three roomy divisions (external complaints, internal complaints, suspected contagious or infectious and obviously contagious or infectious cases); (2) the lazaret proper, with three divisions; (3) the distribution place (*a*) to the original troop, (*b*) to the horse depot, (*c*) to the lazaret at the camping place. The construction of lazarets is best effected in barracks, goods yards, factories and warehouses, or it must be made in tents and wooden structures.

Meadows and paddocks are important for mares advanced in pregnancy, and with foals. Barrack-like wooden stables (air halls) serve well in respiratory diseases.

Management and Duties.—Under a new regulation, the management vests in a commanding officer, who must be a veterinary surgeon and who is responsible for the technical direction and management, but exercises no disciplinary power.

Every newly-acquired horse is described and entered with the current lazaret number in the record book, and distinguished by a tin disc, numbered, and plaited into the mane and tail, and by branding the hoof. After a strict clinical examination it is put into its proper group, and the mallein and blood tests are applied. If free from contagious or infectious disease it passes into its proper lazaret. The directing veterinary surgeon does not generally concern himself with the treatment, but gives general instructions, and decides on cases for evacuation. Cured horses are transferred to the evacuation station, where they are well fed and cared for and ridden or exercised in order to get them fit for work again. Subordinate officers, attendants and young veterinary surgeons are allotted to the veterinarian as assistants. Every seven days all the horses are well overlooked, and from time to time, especially before discharge, they are submitted to the mallein and blood tests.

The hospital record is strictly kept—each horse has a distinct page, and is classified according to special principles.

The troops are always advised as to the locality of the horse collecting stations, and the lazaret, which preliminary conditions are necessary for things to run smoothly.

A Special Lazaret is provided for mange cases; it has hot-air rooms for clipping, bathing, and washing, and dressing the skin. Such lazaret, according to Miessner, must possess: (1) a taking-up stable, until after the blood test (*a*) for horses badly infected, (*b*) for horses slightly affected (less than one-third of the body surface); (2) a proper lazaret with stables for treated and non-treated horses; (3) a recovery stable.

Clipping is very important, and is accomplished with a hand-driven machine. Brushing and washing, or dipping, is necessary. Rohol's lime-water mixture is an ideal scab remedy. Other specially useful lazarets are a glanders and brust-seuche (influenza) structure.

(4) REMARKS ON OUR LAZARETS.

Austria.—Very badly organised at the beginning of the war. The lack of them caused great hindrances and loss. Now each division has its mobile horse hospital, communication and base hospitals.

Bulgaria.—Probably non-existent, although not known for certain.

Turkey.—Organising after the German style.

(5) DEFECTS IN PRESENT LAZARETS.

The personnel is insufficient. A collecting depot should have at least one veterinary surgeon, two subordinate officers, and fifteen men with each 100 to 150 horses. Collecting depots ought to form no part of the lazaret. At present this is the case, and is a source of great weakness. The duties of a veterinary surgeon in a lazaret must be widened. He should have disciplinary power over the men, and not be put under a commanding officer. Horse lazarets should be formed and worked in times of peace, so as to be ready when wanted. A corresponding order to that of the Red Cross in the medical service needs to be formed.—*Swiss Veterinary Journal.* G. M.

URÆMIA OF ACARIAN ORIGIN IN HORSES.

By Veterinary Aide-Major Leneveu

(Of the Veterinary Hospital at Vernon (Eure).

The condition described in this note has been observed in horses affected with generalised mange.

It has appeared to us logical for some time to think that the mortality we were observing amongst these animals was not merely resulting from mange, but was more especially the effect of an infectious malady of a typho-anæmic nature. They were varying factors, of which we quote the following:

(*a*) Absence of fever;
(*b*) Mortality limited exclusively to animals suffering from generalised mange, in spite of the proximity in which they were placed to other non-affected horses;
(*c*) Complete disappearance of mortality after the sale of those generalised cases;

have led us to conclude that the acarus can alone be capable of producing the complications experienced. To us there is no doubt that our horses were dying of uræmia, yet, in reality, it was not exclusively uræmia, but an intoxication of a complex nature of which uræmia played the most important role.

This notion of uræmia of acarian origin has been to us, if not inspired, at least confirmed by the lecture in the *Journal de Medicine et de Chirurgie Pratiques*, of April 10th, 1917, on an article entitled "L'albuminerie Scabique."

Madame Dr. Uebersteld, in her thesis, at Lyon, 1917, has produced on this subject an interesting work, of which we repeat here the following passages:—

(*a*) Scabiec albuminuria, though not so frequent as some authors suggest, yet is in its incidence of some importance.
(*b*) Scabiec albuminuria appears in the following two forms—Slight albuminuria, passive or transitory, and true nephritis, either grave or mild.
(*c*) The clinical course of this nephritis and its prognostic

importance are in all respects the same as a nephritis developed from a chill.

(*d*) This scabiec nephritis might be complicated with grave uræmia, as the two observations quoted confirm.

(*e*) From a consideration of the work one can conclude that there is a true scabiec albuminuria, which must not be confounded with physiological albuminuria, or that resulting from drugs or Bright's disease, which one might meet with amongst scabiec patients. There exists a true acarian albuminuria, the existence of which is only to be charged to the skin parasite.

Of the different forms mentioned by Madame Dr. Uebersfeld, we have only observed the grave nephritis, usually fatal, at least under the conditions in which our sick were placed.

Amongst horses we have never met with a light passive albuminuria, of which she speaks. At the same time we will not say that it does not exist.

SYMPTOMATOLOGY—GENERAL SYMPTOMS.

(*a*) *Changes observed in the Urinary System.*—These changes are relative to the quantity and quality of the urine. Oliguria and anuria are two conditions which are very obvious when following these cases. The colour of the urine is usually dark and of thick, oily consistency; it frequently contains albumen (eight times in twenty samples examined), and usually also biliary pigments (eighteen times in twenty samples examined). The urinary deposit was very abundant. Microscopical examination was not carried out.

(*b*) *Debility.*—The debility appeared to be preceded by oliguria; it is rapid or slow, depending on the course of the disease. It might attain an extreme degree. One of the most curious changes of the amyotrophy to us appeared to be the form the tail took under the influence of irregular atrophy of the coccygeal muscles. The tail became flaccid, tortuous to the point of presenting often in its length four or five curves in different directions.

(*c*) *Calorification.*—As a general rule the complications occurred without appreciable elevation of temperature. In some cases only we have seen the thermometer rise from time to time to $39.^2$ and $39.^6$, without apparently the course of the malady being influenced by these rare and fugitive febrile movements; as a general rule the temperature oscillated between 37 and $38.^6$.

VARIOUS SYMPTOMS.

We have met with disturbances in the following order:—

(*a*) *Digestive System.*—The appetite was in general maintained during a great part of the course of the condition. Usually it only disappeared in the last stages. In some cases, but rarely, we have observed diarrhœa. We have never noticed that the dejections diffused an appreciable fetid odour.

(*b*) *Respiratory System.*—As a general rule the respiratory rhythm to us appeared rather slow. We have observed on the other hand the following changes: Œdema of the lungs in two cases. The respiratory rhythm irregular, approaching Cheyne-Stokes breathing in one case. The respiratory rhythm very slow but regular in two cases (six movements in one of the affected, seven in the other). Pulmonary congestion in three cases.

(*c*) *Nervous System.*—Of the nervous changes, the most frequently met with was a comatose form. Three cases presented choreic movements. In one they were localised to the neck, left side, to the left shoulder, and to the left side of the thorax; in a second they were exclusively placed in the muscles of the left side of the face; in a third they were generalised. Symptoms meningo-encephalic were observed in two subjects, which presented the following changes: Blindness, deafness (in these cases there were often attempts to walk forward in an automatic manner, and falls occurred); another case showed, during the termination of its illness, contraction of the muscles of the neck to the left, pirouetting of the eyes.

LESIONS.

The only constant lesions which we have remarked during our post-mortem examinations were situated in the kidneys. These organs always showed congestion and were hæmorrhagic. Often the capsule was easily detached from the cortical zone. In some cases we have found pus in the hilum. Regarding other organs, we observed congestion of the lungs, œdema of the lungs, hæmorrhagic spots disseminated on the whole course of the small intestine, congestion of the meninges and of the brain.

PATHOLOGY,

What are the causes of the renal changes to produce this uræmia? Madame Dr. Uebersfeld suggests the three following factors:—

1. Cutaneous irritation, producing a reflex action which modifies the renal circulation and brings about functional disturbances more or less grave.

2. The existence in some cases of a true toxi-infectious nephritis.

3. The possibility of the venom secreted by the acarus being implicated in the renal changes must not be overlooked.

There is nothing to show that the same causes are not to be found in the horse, and with all the more aggravation in proportion to the extent of the mange. It is well to add that in the worst cases of mange the overwork to which the kidney is subjected on account of the disorganised skin function may be a contributory cause to the alteration.

On the other hand the uræmia is aggravated in these animals, by auto-intoxication arisingf rom non-function of the skin, and also in certain cases by drug-intoxication. Here lie probably the three essential causes of the complications.

COURSE OF THE MALADY,

The condition may be terminated by a cure under the influence of appropriate treatment. The course the malady takes is rapid or slow. Some subjects become debilitated and die in a few days Amongst others the course is not so rapid, and may be prolonged over one or several months.

Treatment should be on the following lines :—

1. Endeavour to remove from the skin the impurities with which it is soiled and which take away the suppleness.
2. Destroy the acari.
3. Combat the intoxication by diet, hygiene and appropriate treatment.

In order to destroy the acari, we give preference to baths or acaracidal solutions or to sulphur gas. To us it appears preferable to abandon the use of greasy applications and irritant mixtures, especially for badly affected cases. One takes measures against the intoxication by the administration of milk, when that is available. As a diuretic, the acetate of ammonia may be used with profit. We avoid systematically the use of all drugs, internally or externally, which have an irritant action on the kidneys.

The diet for the sick should be choice, rich, and abundant ; mashes, with boiled linseed added, are to be recommended. A green fodder ration would be extremely advantageous.

Hygiene generally and hygiene of the skin are precious adjuncts to treatment and should never be neglected.

⁂ Professor Nicholas, of Lyon, and one of his pupils, Dr. Mathieu, have found sixteen cases of albuminuria in 101 cases of scabies. Other authors, for instance Boas, have had in their researches almost negative results. Madame Dr. Uebersfeld, pupil of Dr. Nicholas, has found seventeen cases of albuminuria in 260 examined. Our researches, limited to a small number of cases carried out on twenty animals affected with generalised mange, have permitted us to find albuminuria in eight, which represents 40 per cent. L. J. K.

ARSENIVAN IN THE TREATMENT OF EPIZOOTIC LYMPHANGITIS.

F. FAVERO, writing in *Il moderno Zooiatro*, states that being encouraged by the results of different experimenters who have obtained good results by the treatment of epizootic lymphangitis with arsenical compounds, he has been minded to try the value of the new antisyphilitic remedy arsenivan. Ten subjects have been treated with complete success. The cure was effected in eleven to thirty days. Arsenivan is well tolerated. Its administration by ingestion and by the vein causes no complication; subcutaneous injection appears to be the most efficacious mode of administration, but it occasions local accidents which it should be possible to avoid with appropriate technique. The dose is 50 centigrammes, and it is renewed every second day.—*Revue Générale de Médecine Vétérinaire.* G. M.

THE CURATIVE TREATMENT OF EPIZOOTIC LYMPHANGITIS BY VACCINE THERAPY.

BY VELU.

THE author, writing in *Bulletin de la Société centrale de médecine vétérinaire,* observes that Wright's method applied to the treatment of epizootic lymphangitis causes a reaction of the organism, which is denoted by very marked symptoms in the specific lesions. Subcutaneous injection of a dose of anticryptococcic pyovaccine produces a positive phase, in the course of which there is aggravation of all the symptoms, suppuration is increased, hypersensibility exaggerated, œdema abundant, maturation of the buds. This phase lasts three to six days; then after one or two days there occurs a negative phase, the œdema declines, the secretions decrease, the wounds lose their specific aspect with raised borders (cloacal appearance) and level up, cicatrisation goes on rapidly; this phase lasts four or five days. A new injection brings about a succession of the same phenomena; but if it is made before the end of the positive phase, the negative phase is only slight, and of short duration. It is therefore necessary to find out the suitable doses, and the intervals at the end of which the injections must be renewed, to determine the insignificant negative phases and the positive predominant phases; on the other hand Wright's vaccines only act when the malady possesses sufficient vitality to cause reaction. It is necessary to avoid too strong or too proximate doses. In practice one injects 2 to 5 cc. of the vaccine and waits seven or eight days. If there is persistent aggravation the dose is too strong; we must wait a few days before injecting a weaker dose. If there is no improvement the dose is too weak; a stronger dose must be injected immediately. If there is plain improvement the dose is sufficient; it ought to be renewed without delay and repeated until followed by complete cicatrisation, which probably occurs in from thirty to forty days. Some experiments on the preventive properties of the vaccine have been made by vaccinating all animals belonging to contaminated units stationed in the infected region of Maroc.—*Revue Générale de Médecine Vétérinaire.* G.M.

THE PRODUCTION AND SELF-DESTRUCTION OF DOMESTIC FLIES IN HORSE MANURE.

By M. E. ROUBAUD.

Horse manure is the best medium for the development of the domestic fly. All the other materials (diverse manures, excrement, liquid manure, sweepings) to which one ordinarily accords a rôle in the production of the fly do not really come into question.

Manure kept only for twenty-four hours in a stable produces in the warm months an average of 10,000 to 20,000 flies per cubic metre ; the proportion may even reach 30,000 to 35,000. It is estimated that a horse produces sufficient manure to give rise to the development during summer of 40,000 to 50,000 flies per month, even 160,000 to 200,000 flies during the most favourable season, viz., June and September.

Fresh manure alone plays a part in the production of flies. The laying of eggs even takes place in the stable on the dung impregnated with urine, an indispensable condition. Oviposition may continue for twenty-four hours, but never later. Fermentation, after barely twenty-four hours, definitely protects the manure from the laying of eggs. Antiseptic substances and larvicides (borax, cresol, ferrous and ferric salts), by delaying fermentation, may prolong deposition one or two days. Employed as larvicides these substances, by prolonging the period of infestation, often produce a result the very opposite of that intended. From the sixth day manure when placed in a heap does not contain larvæ, these having migrated to the base for nymphosis. Anti-fly measures, therefore, ought to be taken within five days of the removal of the manure from the stable. Manure twenty-four hours old at the time of the removal does not contain visible larvæ. The eggs which are disseminated throughout the manure heap then open and the larvæ come to the surface, leaving the central parts as fermentation develops and the temperature rises. On the following day a temperature of 70°C. to 90°C. may be found in the centre of the heap. The heat arising from fermentation in a manure heap may be used as a means of destroying the larvæ which it contains. The larvæ of the domestic fly, protected from the gases of fermentation, dies in three minutes when exposed to a temperature of 50°C. In contact with the gases it dies in one minute at 51°C., in five to seven seconds at 59°C., and four to five seconds at 60°C. When a manure heap is turned over the larvæ which come in contact with the hot parts in the interior are killed at once. A complete stirring up of the manure on the day after the deposition, and repeated on the two following days, causes a disappearance of ninety per cent. of the larvæ. This operation is more easily and quickly done if, instead of waiting until the infected heap has itself produced the necessary temperature, it is exposed to the heat of a heap previously fermented. For this purpose, instead of placing the new manure on the surface of the heap as is usually done, it should be buried in the hot parts by covering all its surfaces with a layer of hot manure twenty centimetres thick. In four or five hours the new manure may be considered as entirely free from eggs and larvæ, which would otherwise have developed in thousands. This biological method of delarvization by heat is equivalent to the heating of the whole of the fresh manure to a temperature of 50°C. to 60°C., and is effected without apparatus and without fuel. It is within the reach of all and only a simple training of the personnel is required. In practice, it is found that the mass of fermented manure required to furnish the necessary temperature is about eight times that of the fresh manure to be treated. Next day this may be used in its turn as a source of heat. The biothermic method of treating fresh manure can alone destroy quickly and cheaply the eggs and larvæ in a manure heap. The various methods of covering in manure heaps with materials such as earth, straw, etc., can only prevent the flies on the outside from depositing their eggs on the surface of the manure, they cannot hinder the development of the eggs which have been previously deposited on it in the stables. Now these furnish the greatest proportion of the larvæ, and from them, according to my experiments, at least eight thousand to ten thousand flies originate.—JOURNAL OF THE R.A.M.C.

Obituary.

MR. THOMAS WRIGHT, M.R.C.V.S.

MR. WRIGHT commenced practice in Putney in 1900. His principal work was amongst polo ponies at Hurlingham, Ranelagh, and Roehampton Polo Clubs. He was chief veterinary surgeon to the Guards' Club at Southfields. In 1916 he purchased for his son, who had just qualified, the practice of the late Mr. J. W. Brownless, of Barnes and Kensington. During the Boer War Mr. Wright acted as Transport Veterinary Officer. He again offered his services in 1914, and from that date to December, 1916, he made many voyages between Britain, Canada, America, and other countries until December, 1916, when his ship was torpedoed and sunk. He then for a time acted as Civil Veterinary Surgeon to the Woolwich Remount Depot. His health, however, already undermined by his experiences afloat, gave way, and he was forced on medical advice to resign. Death occurred on January 1st at Nottingham, while on a visit to his son-in-law, Mr. K. P. Rankin, M.R.C.V.S., D.V.H. The interment took place in Manchester in the family grave on January 5th, 1918. Mr. Wright was 62 years of age, and leaves a widow, two daughters (Laura and Elsie) and three step-daughters, and one son, Captain T. Lewis Wright, A.V.C., who is serving in Mesopotamia.

MR. J. A. TODD, M.R.C.V.S.

NEWS has been received of the death, in Scotland, of Mr. John Alexander Todd, and keen regret was expressed by a very wide circle of friends. It was twenty years ago that Mr. Todd, a member of the Royal College of Veterinary Surgeons, came to Worthing and established himself in practice, subsequently transferring himself to premises in Chapel Road, specially built for his occupation, and known as the Animals' Hospital. In the summer of 1913 Mr. Todd effected an exchange of practice with Mr. Percival Carter, at West Kirby, in Cheshire, not far from Liverpool. After the outbreak of war he entered the veterinary branch of the Army, and attained the rank of Major in May, 1915; but he subsequently returned to civil practice, and it was at Campbeltown, in Argyllshire, that his death occurred on the last day of the Old Year. During his student days Mr. Todd was a member of the Glasgow Queen's Regiment, and when he came to Worthing he obtained a Commission as Veterinary Lieutenant in the Hampshire Carabiniers, being subsequently transferred to the Sussex Yeomanry. Mr. Todd was largely responsible for the success of the Southern Counties Veterinary Society, for he assumed the honorary secretaryship when the membership was only twenty-five, and when he relinquished the office, on his departure for the North, the number had been increased to nearly eighty. Mr. Todd, who was 46 years of age, leaves a widow and three daughters, now living at Kilcreggan, in Argyllshire, and much sympathy will be extended to them by their Worthing friends in their great bereavement.

THE

VETERINARY JOURNAL

Editor:

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor:

GLADSTONE MAYALL M.R.C.V.S.

MARCH, 1918.

Editorials.

THE DISEASES OF FOWL AND FISH.

THE poultry stock of this country represents no inconsiderable amount of capital value, and the revenue derived from fish is a very big one. It seems likely that before we are through with the difficult times here that we shall have to make heavy calls on creatures that swim and fly. It has been suggested that a good store of food lies to hand in the eggs of sea-fowl, and that this source may be tapped almost without limit. Those who have ever eaten the eggs of the water-hen, or plover, know how palatable they are, and there is little doubt that the eggs of the marine and aquatic birds that surround our coasts will come in very acceptable if an organised plan of collecting and distributing them is devised.

Considering the importance of fish and fowl it only accentuates the statement recently made by a discerning lady—"there is a big vein of laziness in the Britisher's disposition"—that little research has been made in the diseases of these creatures, and that as veterinarians we are not as well up in their complaints as we ought to be. Both furnish means of quickly, easily, and cheaply increasing the food supply of the country. The increased breeding of ducks and geese will also help. Feeding problems with regard to them must be overcome by intelligence and foresight and it is rather a sign of muddle and inefficiency that any difficulty occurs in the matter.

Recently an enquiry was made about aspergillosis in birds, and not long ago a gentleman stated that "nobody knew anything about swine fever." In the one case it appears as if investigation is in its infancy, whilst in the other it looks as if "much study is only a weariness of the flesh."

Many diseases of fish and fowl will pay for investigation. Furunculosis of fish is a disease which causes considerable loss. It is characterised by hæmorrhagic inflammation of the bowels and bleedings in different organs, especially in the muscular tissue and spots and ulcerations in the skin. In closed waters one way of destroying a considerable number of the bacteria which cause the spread of the disease is the use of potassium permanganate in dilute solution which does not injure the fish. Fishing out and selling the sound stock is another way of dealing with the malady. We do not think it has been conclusively proved that furunculous fish never transmit disease to man, and it may be worth while investigating fish supply as a possible source of some of the crops of small boils that not a few men who have been on active service have suffered from. In any case a different view of the likelihood and possibility of infection or contagion from fish to animal may be taken from that from fish to man. We ourselves have seen a peculiar disease in ponies characterised by crops of nasal, oral ecchymoses and pustules and perineal pustules, and raised discharging patches on the skin; and in all the cases the ponies were engaged in carting fish and frequently licked fishy surroundings and damp fish carts. They entered yards where fish were gutted and cleaned.

Aspergillosis of birds is hard to cure, but now and then birds recover by applying flowers of sulphur or tincture of iodine to the patches that can be reached, and letting the fowls inhale the vapours of tar water or turpentine in a closed room

Black head, white comb, roup, coccidiosis, white diarrhœa of chicks, fowl cholera, and chicken pox are all infectious diseases which need further investigation and research work conducting on them.

The prevention of disease, however, is always more important than its treatment where poultry are concerned. The veterinarian must not only be able to diagnose and suggest remedies in diseases of poultry, but to enlighten the owner as to the best way to prevent infectious complaints. Good eggs from healthy flocks, clean incubators, small flocks, sound ground, cleanliness, and disinfection, clean food and water are all of importance in the rearing of healthy profitable fowls.

G. M.

MILK.

There are a good many matters in connection with milk that need probing and settling. In many Continental countries the veterinary surgeon takes a far more prominent part with regard to milk than he does here—he is consulted oftener by those in difficulties with their supply and he has a greater say and influence in questions affecting its production and distribution. Considering its importance as a foodstuff and the vital necessity of an adequate quantity we think too little time, effort and money have been devoted to a consideration of the many points in connection with it by those concerned in this country.

If we knew more about how the fluid is secreted in the healthy udder of a cow milk supply might benefit considerably in quality and quantity.

The prevalent theories at present are that milk is formed directly from the blood, the gland merely acting as a filter ; that it is the product of the decomposition of epithelial cells ; a third theory—which has most evidence to support it—is that milk secretion is due to a specific activity of the gland cells of the udder through which the constituents brought to the gland in the blood stream undergo a certain chemical change and thus the definite product called milk is formed. In other words, milk is formed by blood constituents and cell activity in the gland.

Variations in genuine milk need further investigation. It ought not to be difficult to lay down a definite limit within which milk as it comes from the cow may vary in fat contents and solids not fat.

Speaking with a representative farmer in this district a few weeks ago, he said he was certain that genuine milk never varied more than 2 per cent. in fat contents. Incidentally he also said that he had created heated arguments at meetings of farmers where he had stuck to his guns on this question. A consideration of available literature seems to indicate that this farmer's contention is absolutely true, and well within the mark, but no direct work seems to have been undertaken with a view to proving it.

We all know that prolonged drought or excessive rainfall affects the quality of milk and most of us think that a high wind is not beneficial for milk secretion. The veterinary surgeon ought to be in a position to settle some of these points definitely when disputes arise between those who know and those who do not know.

Inasmuch as nervous influences play a great part in milk secretion, prosecutions of farmers and milk producers ought not to succeed where it is found that cows have suffered from shell shock or been greatly and repeatedly affrighted by low flying aeroplanes.

The employment of more veterinary surgeons to authoritative positions in connection with cows and milk is all for the benefit of milk knowledge, and those who are engaged in the production and distribution of the food.—G. M.

Original Communications.

GENERALISED SARCOMATOSIS OF THE FOWL.

By B. F. KAUPP, Pathologist,
N.C. Experiment Station, W. Raleigh, N.C.

THE records of this laboratory show that of 730 autopsies held upon hens and cocks ranging in age from twelve months to three years, 8, or a trifle over 1 per cent., were affected by generalised sarcomatosis. Round-celled sarcoma is the most prevalent type, and round-celled lympho-sarcoma is frequently observed.

A sarcoma is a connective tissue tumor whose elements, either because of their number or often because of their size, predominate over the intercellular substance. Sarcomata are closely related to the undeveloped connective tissue, so that sarcomatous may be compared with embryonal tissue.

Sarcomata develop either in previously normal tissue belonging to the connective tissue group—as, for example, in the skin, subcutaneous tissue, intermuscular connective tissue, periosteum, spinal cord, meninges, connective tissue of glands, and other similar locations. It may also develop in some pre-existing connective tissue tumour, as in fibroma, myoma, or chondroma.

The sarcoma cells may be of a small or a large round-celled variety or they may be of small or large spindle cells, or a mixture of these two principal varieties.

The first case here recorded was in a Barred Plymouth Rock cock.

History.—A Barred Plymouth Rock cock, from a breeding pen; age, 15 months; leg band, No. 178. This bird had not been noted to be sick up to within three days before his death. During these last three days he appeared dull, ate very little, and died March 2nd, 1917.

Protocol.—Upon opening the abdominal cavity the liver was noted to be very much enlarged, weighing 146 grams., or four times its normal size. In the liver substance there were observed small, white nodules, the largest of which measured 8 mm. in diameter. The sectioned surface of the liver was soft and the new growths were not encapsulated. The proventriculus contained two nodules 10 mm. in diameter. Several small nodules were observed in the mesentery. One nodule was noted in the pectoralis secundus muscle; this nodule measured 2×3×13 mm. Several nodules were also observed in the heart muscle, the largest of which was 20 mm. in diameter. One small nodule was located in the spleen which measured 4 mm. in diameter. There were two small tumours located in the upper edge of the obturator internus muscle, one measuring 5 mm. and the other measuring 10 mm. in diameter. One nodule was observed in the first limb of the duodenal loop ; this nodule measured 2 mm. in diameter. One nodule was located in the left thoracic wall, which nodule measured 20×10 mm. There were two new growths involving the kidneys, one measuring 15 mm. in diameter, and the other 20 mm. in diameter. Fig. 1 shows the gross lesions of the various organs.

Microscopic Study.—Sections of the heart and liver were prepared and studied. Fig. 2 shows a section from the heart muscle in which there will be seen embryonic type small round cells invading the muscle. There is no limiting membrane or capsule. It is a small, round-celled sarcoma.

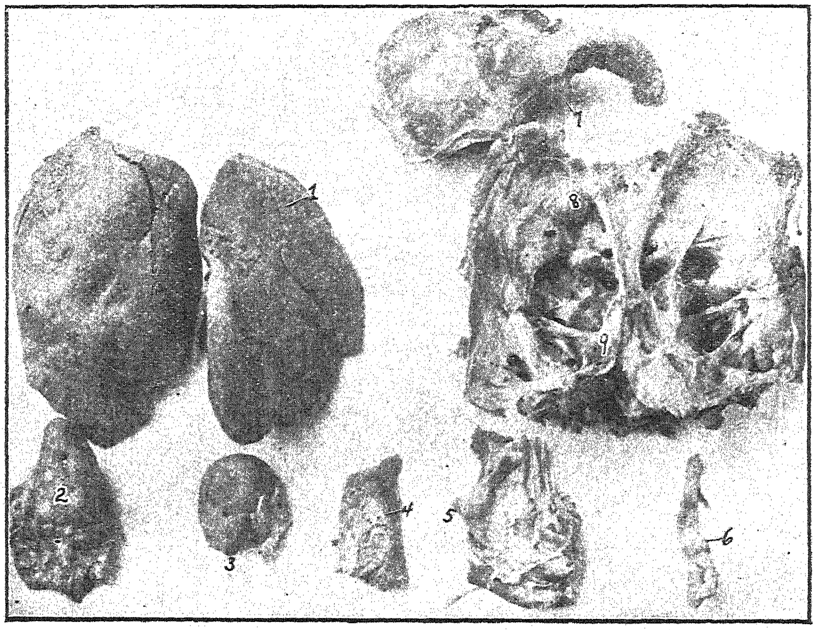


FIG. 1.—PHOTOGRAPH OF VISCERAL ORGANS OF BARRED PLYMOUTH ROCK COCK 15 MONTHS OLD. (1) Sarcoma of the liver ; (2) sarcoma of heart ; (3) sarcoma of spleen ; (4) sarcoma of pectoralis secundus ; (5) sarcoma of inner surface of the rib ; (6) sarcoma of the wall of the small intestine ; (7) sarcoma of the proventriculus and gizzard ; (8) sarcoma of the edge of the obturator internus muscle ; (9) sarcoma around the ischiadic artery.

The second case here recorded was in a Single Comb White Leghorn hen.

History.—A Single Comb White Leghorn hen, No. 101, hatched March 8th, 1916. She was a member of a pedigreed flock, and died May 1st, 1917. She began laying at the age of six months and produced, according to trap nest records, eight eggs in October, nine in

November, seven in December, none in January, and seven in February. The last egg laid in a trap nest was February 28th, 1917. The pullet appeared in fair condition, with an apparent tumefaction and ulceration just below the anus. She appeared in good health till a few days before her death.

Protocol.—The carcass was in thin condition. There was an absence of retroperitoneal fat. The tumour in the region of the anus measured 4·5×3×4 cm. in its three diameters. The surface was ulcerated and covered with a scab. The surface was somewhat irregular. The sectioned surface was whitish, soft, and liver-like in consistency.

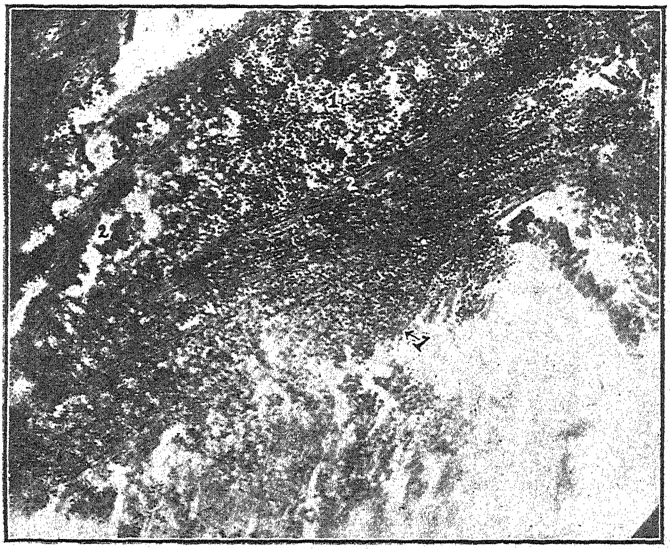


FIG. 2.—PHOTOMICROGRAPH OF SECTION OF HEART FROM CASE SHOWN IN FIG. 1. (1) Round sarcoma cells; (2) muscle.

Two tumours involved the ovary; one measured 4×4×2 cm., the other 4 cm. in diameter. The appearance was the same as in the above tumour. The left kidney was practically all replaced by the neoplasm and was four times its normal size. The anterior and middle lobes of the right kidney were similarly affected; the posterior lobe showed no growth, but was reddish in colour and enlarged. Several tumours were scattered throughout the walls of the intestines; these varied in size up to 1·5 cm. in diameter. One tumour 1 cm. in diameter was located in the lower edge of the right lobe of the liver, and a growth had developed from the lower edge of the left lobe. This measured 7×3·5×3 cm., and was the largest of all. The appearance and consistency of all were the same. Fig. 3 shows a photograph of this case.

Microscopic Study.—Sections from the liver and kidney were prepared and studied. This tumour was a small, round-celled sarcoma. Figs. 4 and 5 illustrate the small, round cells invading the liver tissue. At Fig. 2 can be seen the liver cells, which are pushed apart by masses of the small round sarcoma cells.

The third case here recorded is a Single Comb White Leghorn hen.

History.—This subject was a Single Comb White Leghorn hen hatched April 4th, 1916, and died April 14th, 1917. She laid one egg in February and four eggs in March. These were all that the trap nest records show. She did not lay after March 29th, 1917.

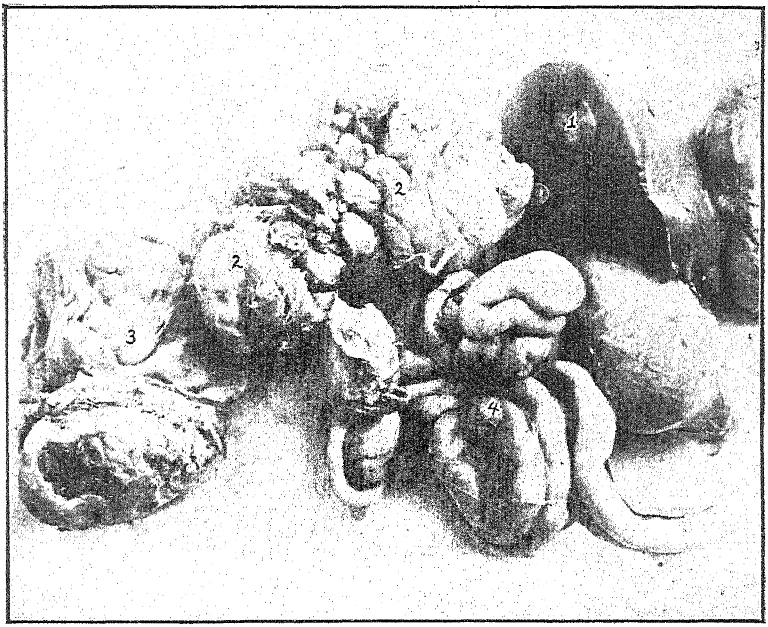
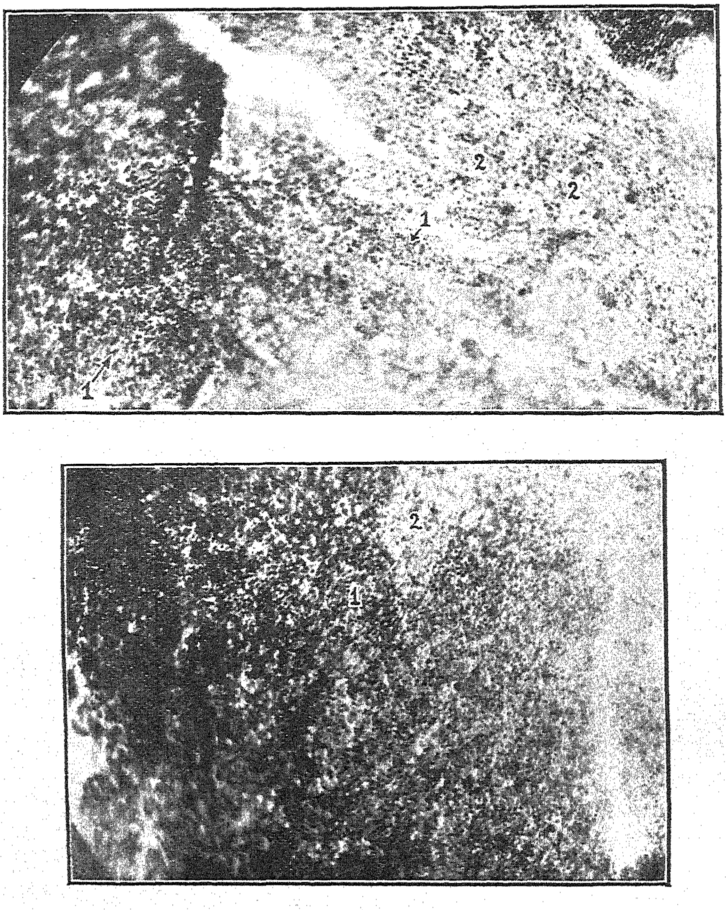


FIG. 3.—PHOTOGRAPH OF THE VISCERAL ORGANS FROM THE SECOND CASE, A SINGLE COMB WHITE LEGHORN. (1) Sarcoma of the liver; (2) Sarcoma of kidneys; (3) sarcoma of the rectum; (4) sarcoma of intestine.

Protocol.—The carcass had a somewhat unkempt appearance. There was very little retroperitoneal fat. The bird was thin in flesh. The head and unfeathered parts were normal, and there were no palpable tumours. Upon opening the abdominal cavity there were noted five tumours of the abdominal viscera. Two of these tumours were on the duodenal loop and measured 4×3×2 mm. in diameter.

There were also two tumours located in the wall of the cæcum. These tumours measured about the same as the preceding. There was one large tumour involving the wall of the free portion of the small intestine. This is shown in cut number 1, which is a photograph of the sectioned surface. The tumour is 6 cm. long, and the wall at 2 is 1 cm. thick. Fig. 6, letter A, shows at 1 the lumen of the intestine, which in the centre is filled with ingesta. Letter B shows the inner wall. There is to be noted a slight sacculation on the tumour side of the bowel. At 2 there is noted a perforation. At this point there is ulceration, but there was apparently no ingesta finding its way out



FIGS. 4 AND 5.—PHOTOMICROGRAPH SECTION OF LIVER FROM CASE SHOWN IN FIG. 3. (1) Round sarcoma cells infiltrating among liver cells; (2) liver cells.

into the abdominal cavity. At this point there was adhering firmly to the intestine a fold of the mesentery. This section of the mesentery was thickened and showed some signs of inflammation.

Microscopic Study.—Sections were made and studied from the wall of the tumour of the bowel and from the section of mesentery. The major portion of the tumour consisted of cells of an embryonic type. The nuclei were large and the cytoplasm small in amounts. There were a few strands of connective tissue along the inner portions of the tumour. This connective tissue may have been a remaining portion of the sub-mucous connective tissue. The balance of the tumour was free from connective tissue. The cells besides appearing like embryonic cells were of a large type, resembling those of a large-celled sarcoma and round in type. The portion of mesentery was infiltrated by similar cells.

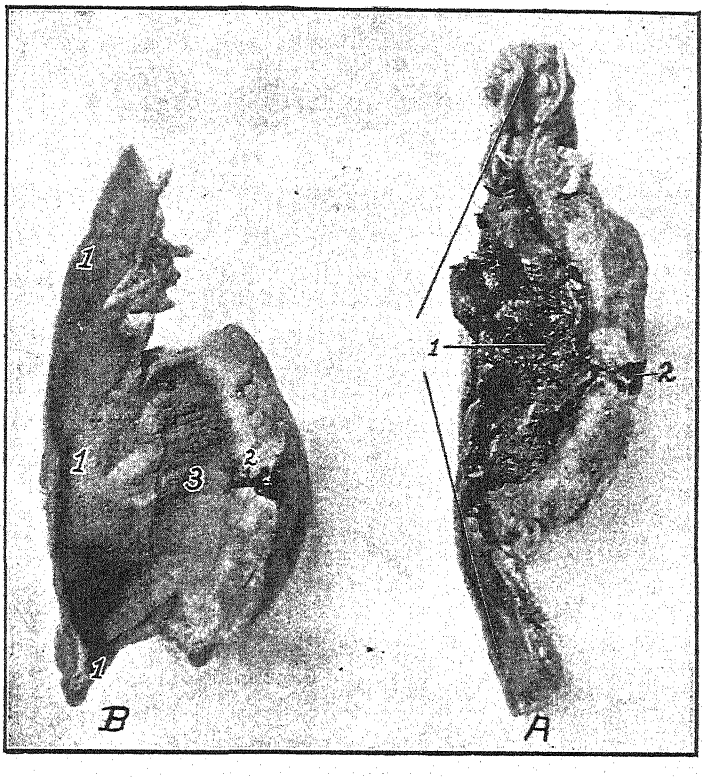


FIG. 6.—PHOTOGRAPH OF SARCOMA OF INTESTINE FROM CASE 3, showing at (1) lumen containing fæces; (2) a perforation communicating with the peritoneal cavity; (3) a diverticulum of the intestine.

INTUSSUSCEPTION IN THE DOG.

By A COUNTRY PRACTITIONER.

THE subject of the following case was an Airedale which I had received a message to visit. On arrival I found the history of the case to be as follows :—For some weeks past the dog had been subject to attacks of vomiting, which would last off and on for a few hours to a day or two, when during the attack he would appear dull and in pain but present no severe symptoms. The sickness would pass off and he would be all right until another attack occurred.

The owner was a lady who had lately come to visit this neighbourhood, and the dog had been under treatment previously. On my arrival I found the patient much easier than he had been and the sickness had abated. On enquiry, no worms had been seen to be passed ; he merely looked dull and listless. Thinking the case must be one of indigestion, I left some sedative powders of bismuth and sod.-bicarb., and he was given a dose of castor oil.

The next day he was brighter and appeared to ail very little. In two or three days he seemed all right, except that his appetite was not quite so good as usual.

In a few days more I got another message saying the dog was very sick again, and in great pain. Being 6 miles away it was some time before I got to see him, when he seemed easier, but much worse than he was the first time I saw him. The eyes were red, the nose hot, and he was dejected ; but still no severe pain.

I now began to suspect he must have some intussusception ot the bowel, or a partial twist ; but the difficulty was how to account for the different attacks of vomiting and then apparent recovery continued over so long a period. However, in two or three days more an urgent message came, saying the dog was very ill and breathing very quickly.

On arriving I found him to be as described, and he had every appearance of pneumonia. The usual medicine was prescribed, but the case seemed hopeless. He died during the night.

Desiring to see if I could find out anything more definitely about him, I made a *post-mortem* next day. A small quantity of fluid was thrown out into the chest, and some in the pericardium, and the lungs were slightly inflamed. The bowels were pale in colour and nearly empty. In the duodenum I found the cause of the trouble, which was that a small portion of the bowel, about ½ inch, was intussuscepted, and the walls were thickened and red. With a slight pull this could be straightened out, and in attempting to put it back again as I found it, a little pressure had to be exerted ; then when it got past a certain point it went back with a rush. I did this several times.

Here evidently was the cause of the attacks of sickness and recovery. When intussusception took place the sickness came on. Then, the bowel straightening out again, he got ease and kept all right until the bowel slipped once more into itself. Apparently this had occurred several times.

Thinking this case must be somewhat unusual is the reason of my submitting it to you.

NOTES IN REGARD TO HORSE LICE, *TRICHODECTES* AND *HÆMATOPINUS*.

By MAURICE C. HALL, Ph.D., D.V.M.,
Parasitologist, Research Laboratory of Parke, Davis & Co., Detroit, Mich.

Horses are infested with two kinds of lice, the sucking louse, *Hæmatopinus asini* (*Hæmatopinus macrocephalus*), and the biting lice, *Trichodectes pilosus* and *Trichodectes parumpilosus*. The two forms are readily distinguishable, as the sucking louse is a larger louse with a long, pointed head and the biting lice are smaller forms with a blunt, rounded head. (See figures.) The sucking louse, as the term suggests, is a blood-sucker. The biting louse lives on the superficial epidermal scales and the debris and secretions present on the skin. The sucking louse is probably the more vicious pest of the two, as the loss of blood from the attacks of large numbers of these lice may be a serious matter. There is probably little difference in the degree or amount of annoyance due to the presence and irritation from the two different kinds of liee, but even here the puncturing of the skin by *Hæmatopinus* is perhaps more irritating than the biting of the superficial epidermis by *Trichodectes*. Both forms give rise to itching, and the results from this are often surprisingly unpleasant. A barn full of horses may become a pandemonium as a result of lice. The itching animals attempt to relieve the itching by rubbing and biting, other animals start to kick, presently the kicking becomes general and there is a resultant clamour and din, with a substantial element of danger to the horses and attendants. Occasionally the lice will give rise to eczema. Lice seem to be more numerous in late winter or early spring. They are more readily detected when horses stand in the warm sunshine, as this brings the lice to the surface. The sucking lice are especially easy to detect on white horses.

Many persons, writing on horse lice, discuss periods of treatment, remedies, and other matters for biting lice and sucking lice together, apparently on the bases that a louse is a louse, and, more especially, that a horse louse is a horse louse. But inasmuch as there is a rather wide gap between a sucking louse and a biting louse, the first belonging to the Hemiptera and the second to the Mallophaga, it might be safely assumed that there would be considerable difference between the two kinds as regards not only structure but also bionomics, and consequently details of treatment. A few very tentative experiments seem to confirm this idea.

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* Journal of the American Veterinary Medical Association.

In the purchase of hundreds of horses for the serum work of Parke, Davis & Co., there is more or less trouble as a result of the importation of lice on new purchases, and this problem becomes more acute in winter, when dipping is no longer feasible. During the summer lice may be readily controlled by dipping, a coal-tar dip furnishing a cheap and satisfactory means of freeing horses of lice. During the past winter the writer has assisted the veterinary staff at Parkedale and has undertaken a few rather simple experiments to obtain a little information which did not seem to be available. The principal object of this paper is to make those results available to others and to make public such findings as are in any way new.

SUCKING LOUSE.

BITING LICE.

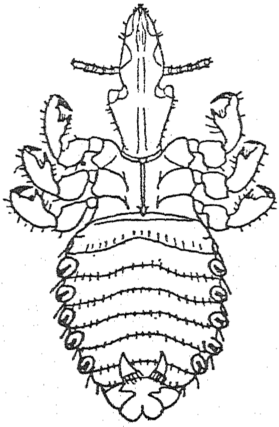

FIG. 1.—*Hæmatopinus asini* (*H. macrocephalus*) Female. x16. After Neveu-Lemaire (1912).

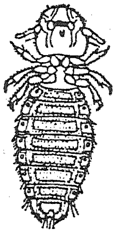

FIG. 2.—*Trichodectes parumpilosus.* Female. x14. After Neveu-Lemaire (1912).

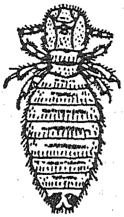

FIG. 3.—*Trichodectes pilosus* (*Tr. vestitus*). Female. x14. After Neveu-Lemaire (1912).

HORSE LICE.

In the first place, 38 horses were selected for examination for lice, taking those on which lice had been seen or where the restlessness or evidence of itching suggested the presence of lice. Of these horses, lice were found on 24, or 63 per cent., so that of cases presenting evidences of lousiness clinically, conviction in the shape of lice found was not obtainable in quite a number of cases. Of the 24 horses found infested with lice, 22, or 92 per cent., were infested with sucking lice, *Hæmatopinus asini*, and only 2, or 8 per cent., were infested with biting lice, *Trichodectes pilosus*. The infestations with *Hœmatopinus* ranged from very light to very heavy; those with *Trichodectes* were both very heavy. It is interesting to note that Osborn (1891), contrary to our experience here, found the biting lice most common in Ohio at the time he wrote, and says of the sucking louse *Hæmatopinus*: "Notwithstanding the probable frequent occurrence of this species, we have as yet failed to meet with examples. The biting lice from horses have been secured in great numbers, but we have searched in vain for this one." Even five years later, Osborn (1896) writes of *Hæmatopinus*; "The biting lice have been secured in great numbers, but we have searched in vain for this one, and but few have come to hand." As regards the species of biting lice found, we are again at vairance. I found no specimens of *Trichodectes parumpilosus*, while Osborn (1891, 1896) says of *Tr. pilosus*: "We have not been fortunate enough to secure examples of this form, though we have the other in great abundance." The difference in Osborn's findings and our findings as regards the relative abundance of the two species of biting lice is paralleled in Europe, where Fiebiger (1912) has pointed out that Railliet considers *Tr. pilosus* the more rare, while Taschenberg considers it the more common of the two species. Neveu-Lemaire (1912) agrees with Taschenberg.

Experiments showed a great difference in the length of time the sucking lice could live off their host as compared with the biting lice. In a number of tests sucking lice, *Hæmatopinus*, lived one or two days, the last of them never surviving beyond the second day after their removal from the horse. On the other hand biting lice, *Trichodectes* lived from five to eight days, the last of them being found dead on the ninth day. One factor which may partly account for this is the fact that both species of lice were kept in vials with small amounts of the horse's hair, removed when the lice were collected. This hair perhaps furnished food for the biting lice, while the sucking lice, deprived of the blood which constitutes their food, speedily starved. In spite of this, the experiment indicates that stables are apt to be capable of infecting horses with biting lice for a period of at least eight days, at the temperatures noted below, even disregarding the presence of eggs, whereas stables would probably be incapable of infecting horses with biting lice after being kept empty for two or three days at these temperatures, if we disregard the presence of eggs. The presence of eggs in stables would depend largely on whether the horses involved were shedding or losing hair in other ways. There would seem to be little likelihood of the eggs becoming detached from the hairs. Newly-hatched lice of either the biting or sucking kinds died inside of two days when kept off a host animal. I have no data in regard to the humidity conditions of these longevity experiments, and only the temperature range, which was from 21° to 31° C. (70° to 88° F.). The lice would probably live longer at lower temperatures.

Louse eggs may be readily distinguished from the eggs of the bot-flies by the fact that lice attach their eggs to the hairs at a point close to the skin, so that they are not easily seen unless the hair is parted to look for them, whereas the bot-flies attach their eggs on the hairs at a point remote from the skin. Bot-flies commonly attach their eggs to the hairs, and especially the long hair of the fore-legs, shoulders, nostrils, chin and mouth, places readily accessible to the mouth of the horse, since the larvæ must get to the stomach of the host. In our experience, lice eggs were most common in the flanks and around the angle of the jaw, the latter a point not accessible to the mouth. The eggs of lice and bot-flies can be further differentiated by the fact that the louse egg is a symmetrical affair, the cap of the egg rounding off the unattached end like the lid of a barrel, while the bot-fly is asymmetrical, the cap of the egg being set obliquely to the longitudinal axis of the egg. The bot-fly egg is transversely striated; the egg of *Hæmatopinus* is finely stippled, the stippled dots being at the intersections of a network of lines; and the egg of *Trichodectes* is smooth. The eggs of *Hæmatopinus asini* are an opaque, creamy white, 1·2 to 1·27 mm. long and 530 to 540 μ thick, measuring mounted specimens and excluding the adhesive mass that attaches the egg to the hair. The eggs of *Trichodectes pilosus* are daintier, more translucent affairs, with an iridescenr sheen, and are smaller, 830 to 880 μ long and 390 μ thick. Louse eggs are usually attached to one hair, but an occasional egg is found attached to two hairs.

A few experiments were undertaken to determine the length of time required for the hatching of *Hæmatopinus* and *Trichodectes.* In these experiments eggs were collected from horses and kept in Petri dishes under atmospheric conditions of humidity and temperature. The humidity factor was not ascertained; the temperature range was the same as that for the longevity experiments, 21° to 31° C. (70° to 88° F.). The length of time the eggs had been on the horse was, of course, unknown, so that the periods obtained only serve to show that eggs may require that much time to hatch; they may require longer.

In the case of *Trichodectes pilosus,* eggs hatched in the course of five or six days. A majority of the eggs remained unopened at the end of fifty days, the young lice being found dead and shrivelled within the shell at the end of that period.

In the case of *Hæmatopinus asini,* eggs hatched in the course of ten to eighteen or nineteen days. The large majority of the eggs which were unopened when collected remained unopened at the end of fifty days. These unhatched eggs were dissected open with the following findings: About 66 per cent. of the young lice were dead and shrivelled; about 13 per cent. were dead, but well preserved instead of shrivelled; the remainder, about 21 per cent., appeared to have undergone autolysis, the egg content being fluid and unorganised. It appears likely that the failure to hatch on the part of the large majority of the eggs tested is to be attributed to unfavourable incubation conditions rather than to any common tendency to fail to hatch under normal conditions. On the other hand, the examination of large numbers of eggs collected from horses showed a majority of these eggs to be already opened, so that in a given collection of opened and unopened eggs the unopened ones presumably include those functionally incapable of maturing or opening, which defective eggs would persist in the horse for long periods.

The length of time required for maturation of the lice on horses was not ascertained, and I have been unable to find this point covered by definite experiments in the literature available to me. This is data that should be available before one can speak with certainty as to the proper intervals for dipping. Since the dips used kill the lice, but not the "nits," we must know the time required for a female which hatches right after dipping to become mature and deposit eggs, for this is approximately the period during which we may postpone dipping. We must not postpone it until the female has actually deposited eggs. The other time factor concerns the length of time required for eggs to hatch. After the first dipping we must wait until the egg deposited just before that dipping has hatched, in order to kill all the lice emerging from eggs present at the time of the first dipping. The relations of the hatching period and the period of maturation determine the intervals between dippings and the number of times it is necessary to dip. Since the maturation period for horse lice is not known to me, the procedure indicated for dipping, on the strength of the scanty knowledge available, would be as follows: For sucking lice, if animals are only to be dipped twice, dip at intervals of about 3 weeks; if they may be dipped three times, dip at intervals of about 2 weeks, to eliminate the likelihood of a short maturation period resulting in egg production before the latest of the eggs present at the first dipping had hatched. As a rule, however, the sucking lice mature in three or four weeks, according to Herms (1915), and practical experience indicates that two dippings are usually ample for lice. On the other hand, the statement by Herms that sucking lice hatch in five to six days is apparently not true of *H. asini*. The same authority states that biting lice hatch in five to eight days, which accords very well with our findings, and mature in three to four weeks. Under these conditions, horses should be dipped for biting lice twice at intervals of ten to twenty days, probably two weeks being the safest interval. For two dippings, where both kinds of lice are present, an interval of about twenty days appears to be indicated.

The present war calls for all available information along the line of lice control.

As noted earlier in this paper, writers habitually discuss treatments of horse lice as though no distinctions between biting lice and sucking lice need be drawn. I take it that this is due in part to the lack of available detailed information, especially in regard to the bionomics of these insects, on which to make distinctions. The small amount of work that we have done suggests that, even in the use of dips, a treatment commonly regarded as equally effective against *Hæmatopinus* or *Trichodectes*, there are differences worth considering not only in the preferred intervals for dipping, but also in regard to the relative resistance to dips and other insecticides. Tests which are yet incomplete and which will be covered in later papers indicate that *Trichodectes* is more resistant to insecticidal treatment than is *Hæmatopinus*.

A distinction between the effects of treatment on sucking lice and on biting lice of horses which does not appear to have been sufficiently emphasised is the fact that even contact insecticides may be simultaneously "stomach poisons" or ingested insecticides for biting lice. When the horse's skin and its hairy covering is soaked with a dip or covered with a contact insecticide of any sort, it contaminates the food of the biting lice, so to speak, and subjects them to any toxic action arising from ingesting these substances. In this way it may happen that biting lice might survive dilutions of contact insecticides that would kill sucking lice, and yet fall victims to these contact insecticides as a result of their actual action as stomach poisons. As matters stand, we would not recognise this action and would regard the death of the biting lice, which might follow the dipping rather closely, as the result of the insecticidal action by contact. This matter deserves investigation.

Along this same line, the writer would like to record the result of tests of an ingested insecticide on horse lice. In the Annual Report of the Chief of the United States Bureau of Entomology, issued in 1916, Dr. L. O. Howard notes that the work done in that bureau has demonstrated that all the species of lice infesting poultry may be readily destroyed by the application of a very small quantity of sodium fluoride. Sodium fluoride is one of the common stomach poisons used in combating such insects as roaches, and is the base of many roach powders. The method of using sodium fluoride for chickens is given by Bishopp and Wood (1917) as follows: Hold the bird by the legs or wings and put a pinch of sodium fluoride on the head, one on the neck, two on the back, one on the breast, one below the vent, one on the tail, and one scattered on the underside of each wing when spread; or dip the bird in tepid water containing ¾ to 1 ounce of commercial sodium fluoride, or ⅔ of an ounce of the chemically pure material, to each gallon water.

There does not appear to be any reason why sodium fluoride should not be as effective for the biting lice of mammals, species of *Trichodectes*, as for the lice of birds, all of which are biting lice belonging to various genera of Mallophaga. In order to test this, however, one of the two horses infested with biting lice was treated with sodium fluoride, the powder being taken in handfuls and rubbed into the hair practically all over the body. The horse was treated with a contact insecticide. Both horses were very lousy before treatment and both were completely freed of lice by their treatments. A number of other horses infested with sucking lice were also treated with sodium fluoride, while others were treated with various contact insecticides. The sodium fluoride treatment, as was expected, was not successful in destroying sucking lice. While a single experiment with one horse would not of itself establish the efficacy of a treatment, the fact that this success is in accord with the other known facts in regard to biting lice and their treatment makes a rather strong case for this treatment, and without caring to say that its value is established beyond question, we have no hesitancy in saying that it is probably as effective as the experiment indicates and is worthy of trial.

The sodium fluoride treatment has the advantage of being applicable in winter and it apparently does not injure the hair or skin. It has the disadvantage that it is only applicable to biting lice and that a horse covered with powder is not very attractive or even useful in some ways for the time being.

Methods for the control of lice are of special interest at this time. The bringing together of large numbers of horses from all sorts of places in war times habitually results in a rapid spread of these pests and great annoyance to the horses. This, in time, results in trouble for the cavalry and field artillery and work for the army veterinarian.

Obviously, the first control measure is directed against the lice present with a view to killing them. Lice are not especially difficult to kill. The coal-tar dips are cheap and effective, and are the things most commonly used in this country. The Prussian army uses the following: Infusion of tobacco (1 to 25 or 30), with or without the addition of vinegar, which treatment has the disadvantage of being poisonous; sabadilla vinegar, also poisonous, and to be used well rubbed in at infested spots only; fish oil, which may be used in the same way; 1 part of petroleum to 10 of methylated spirit; equal parts of petroleum and rape-seed oil; 2 to 3 per cent. watery solution of creolin or 3 per cent. solution of liquor cresolis compound; grey mercury ointment, not over 150 grains at one application, rubbed over the entire body, either alone or mixed with oil or soft soap, taking care to keep it out of the eyes; or, in case of need, washing the horse with soapy water and, while the coat is still damp, dusting in finely sifted beech ashes or peat ashes and brushing well in. Inasmuch as soap is a good insecticide of itself, it is likely that some relief could be obtained by the use of strong soap-suds if nothing better was available. Louse powders, containing oxytoluol, crude cresol, naphthalin, pyrethrum, sulphur, and other more or less insecticidal substances, may be used. They have the advantage of being available in winter weather when dips cannot be safely used as a rule; they have the disadvantage noted in the discussion of sodium fluoride of temporarily detracting from a horse's attractiveness and usefulness, and are not such effective and simple contact insecticides as dips. The sodium fluoride treatment, as already noted, may be used against biting lice.

Aside from killing the lice present, there are certain prophylactive and adjuvant measures of value. Clipping horses is a great aid in lice control. Plenty of brushing and currying is another aid. Dipping the curry comb and brush in kerosene or a strong coal-tar dip when leaving one horse and passing to another is a measure of value in preventing the spread of lice; due regard must be had for the potential danger of kerosene as a source of fire loss in a stable, and for the fact that kerosene is depilatory for horses. Also, too strong coal-tar preparations irritate the skin. Shake off the excess kerosene or coal-tar preparation after dipping the comb or brush. Where horses can be curried on a picket line, it diminishes the danger of reinfection from lice and eggs which are cleaned off, since these are more apt to perish out of doors and not return to their hosts than would be the case with lice in a stable. It also diminishes the fire risk in using kerosene. The danger of transmitting lice on saddle blankets, horse blankets, and bridles has not been well investigated or reported; the danger exists, but it is uncertain whether it is considerable or negligible. To be on the safe side, these things should be regarded as carriers of infestation and treated accordingly. Cleanliness is almost always valuable in the control of parasites. Clean stables, frequently whitewashed or washed down with preparations of germicidal and insecticidal character are safer than dirty stables. The prompt and frequent removal of manure and stable litter is a measure of value.

Segregation of badly-infested horses and quarantine measures for new animals are measures that are indicated when feasible.

It is interesting to note that a number of European investigators have stated that one way to remove the human body louse from clothing is to put the clothing on a horse. Some writers advance the theory that there is something insecticidal about this treatment and about horses. One of these writers makes the following statements: Lice are rare on horses; baker's assistants protect themselves against fleas by putting their sleeping clothes with the coats of the stable hands; the Ruthenian people put their clothing over horses to get rid of lice; dogs roll in horse manure to get rid of fleas. Another writer surmises that the efficacy of the system of putting the clothing on horses is not due to a repellent odour, as stated by some, but to the lice abandoning the clothing to get on the horse for warmth and nutrition, and then perhaps being killed by the impalpable and irritant powder from the skin. These surmises are interesting without being entirely convincing. Having seen thousands of lice swarming over horses, it is hard for us to believe that a horse is an insecticide. Still it is conceivable that the human louse (Nuttall states that there is no dependable morphological difference between the head louse and the body or clothes louse), if transplanted to a horse, might die of something akin to gastralgia, or even nostalgia.

In conclusion, I would like to acknowledge the courteous assistance and co-operation of Dr. R. H. Wilson and Dr. L. A. Maze in the conduct of the experiments noted here.

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AN INTRADERMAL TEST FOR BACTERIUM PULLORUM INFECTION IN FOWLS.

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DISSEMINATION OF INFECTION IN WHITE DIARRHŒA.

Of the numerous diseases to which poultry are susceptible it is safe to say that bacillary white diarrhœa is by far the most widespread and most destructive. Its ravages are confined principally to baby chicks, but it is the pullorum infection in the hen which is directly responsible for outbreaks of white diarrhœa in the chicks, since a certain percentage of her eggs hatch infected chicks and the excretions of these spread the disease to the other birds in the brood. The exceedingly high mortality of white diarrhœa, amounting in some cases to almost 100 per cent. of the hatch, practically prevents the rearing of chicks in infected flocks. The disease is contracted during the first four days of life, and deaths occur as a rule during the first month. It has been demonstrated conclusively by several investigators that chicks which recover may carry the causative bacterium in the ovary and serve as a source of infection in the future. Infected hens usually exhibit an ovary containing several angular, hard, discoloured ova ; however, the organ may continue to functionate and from time to time an ovum is released which harbours the infective agent. Outbreaks of white diarrhœa as a result of contaminated incubators or brooders could be controlled readily by sanitary measures, but infection through the egg must be prevented by a process of weeding out the carriers among the hens used for breeding.

THE AGGLUTINATION TEST.

Since the presence of the *Bacterium pullorum* in the ovary of the hen is not betrayed by external symptoms, it was necessary to devise a biologic method of diagnosis in order to detect the presence of the disease in the affected birds. The agglutination test was found to be applicable for this purpose, and several agricultural experiment stations have taken up the work on an extended scale, offering the service to poultrymen at a price that barely covers the cost of the work. This, in Connecticut, is understood to be 10 cents a fowl. The work of drawing blood samples and sending to a laboratory is necessarily tedious and relatively expensive as compared with the value of a bird. A simpler, cheaper, and equally accurate diagnostic method would undoubtedly contribute to greater popularity of this valuable work in disease prevention.

NOTE.—This bulletin is a report on a study of a disease of fowls that is quite destructive, and should be serviceable to those who are interested in poultry and poultry diseases.

EXPERIMENTAL WORK.

The writers have undertaken to determine the possibility of preparing a biological product from *Bacterium pullorum* to be used for the diagnosis of the disease caused by that organism. The general idea was to develop a diagnostic method somewhat analogous to the intradermal tuberculin test, particularly as applied to fowls.

TEST OF ARTIFICIALLY INFECTED BIRDS.

Two strains of *Bacterium pullorum* were planted in 1,500 c.c. of plain bouillon in the amount of one loopful each. This culture was at 37° C. from September 19 to October 19, 1914. It was then placed in the ice box until May 4, 1915. On this date 100 c.c. of the culture was passed through a Berkefeld filter. The filtrate was determined to be sterile by cultural tests. Carbolic acid was then added in sufficient quantity to make a 0·5 per cent. solution.

On May 17, 1915, two drops of this filtrate were injected into the right wattle of a hen that had been infected with *Bacterium pullorum* on September 22, 1914. The liquid was injected slightly above the lower border of the wattle and no attempt was made to place it within the layers of skin. Twenty-four hours later the wattle showed an œdematous swelling. The following day, 48 hours after injection, there was noted a pronounced œdematous infiltration of the entire wattle. A swelling of this size in other intradermal tests would be considered as positive. The temperature was normal. On May 20 the swelling of the wattle decreased considerably, and 90 hours after injection the wattle appeared normal. The wattle of a control, a non-infected bird, injected at the same time, remained normal. On autopsy the ovary of the infected bird presented several angular ova typical of pullorum infection. A pure culture of *B. pullorum* was isolated from the ovary. The result of this experiment suggested that a diagnostic test might be developed.

Work with the same filtrate was continued by evaporating 100 c.c. to one-tenth of its volume in a water bath at the boiling point, the purpose being to test the value of a culture filtrate containing the products of the organism in a more concentrated form.

Twelve fowls were injected intravenously on May 27, 1915, with 1·5 c.c. each of a 48-hour bouillon culture of six strains of *B. pullorum.* About two days after inoculation the fowls showed marked symptoms of illness—pale comb, drowsy attitude, and ruffled feathers. Five of this lot died within a period of 26 days as a result of the infection. On autopsy the following lesions were observed: Livers enlarged. darker than normal, and covered with necrotic foci. Spleens were enlarged and studded with necrotic foci. Ovaries contained irregular-shaped, hard, dark-coloured ova, typical of pullorum infection. In one case there was severe pericarditis and in another considerable amber-coloured fluid in the peritoneal cavity.

On June 9, thirteen days after the fowls were inoculated and while they still were sick, blood was drawn for serum tests. Of these, fowl 73 was injected in the right wattle with 0·1 c.c. of the concentrated, filtrate. Three hours after injection considerable œdema of the wattle was observed.

Two control fowls, 74 and 75, supposedly healthy birds, each received 0·1 c.c. of the concentrated filtrate in the right wattle· Three hours later they showed œdema of the wattle, practically of the same extent as that shown by the infected bird.

On the next day the swelling of the wattle of the control fowls 74 and 75 had entirely disappeared, while fowl 73 showed considerable swelling. This swelling continued to be marked at the forty-eighth hour, after which it began to subside.

No reaction occurred as a result, and there remained the alternative conclusion that the test was either non-specific or that the reacting controls were infected. Some of the control birds had been secured in the open market, and nothing was known of their previous exposure. Unfortunately control fowl 87, which showed a slight reaction on June 23, died from intercurrent causes and in the absence of the authors was not autopsied. As appears in autopsy notes later, control fowls 88 and 95, which also had reacted, were found to be infected birds.

On August 25 fowls 76, 95, and 96, and a control supposedly negative were killed by bleeding and samples held for agglutination tests. The ovary of fowl 76 contained angular ova typical of pullorum infection, that of fowl 96 dried encapsulated and cysts, not certainly due to pullorum infection, and that of fowl 95 one or two angular ova and two large cysts.

Cultures were made from ovaries of fowls 76 and 95 which yielded growths charateristic of *Bacterium pullorum*, while that from fowl 96 yielded a heavy growth not resembling that of *Bacterium* pullorum. Fowl 76 gave positive agglutination on 0·01 dilution; fowl 95 in 0·002 dilution, while fowl 96 was negative at 0·04 dilution.

An antigen was made from the culture obtained from fowl 96 and tested against the serum of fowl 76, but gave a negative agglutination at 0·04. The result further strengthens the conclusion that the infection in the ovary of fowl 96 was not due to *Bacterium pullorum*. A check was run on the serum of fowl 76 with *Bacillus abortus* as an antigen, with no agglutination resulting. It is seen that fowl 76 although it did not react well to the intradermal test, gave an agglutination of 1 : 100. Also, fowl 95 was undoubtedly infected with *Bacterium pullorum.*

With a view of securing a diagnostic agent that would increase the size of the swelling in the wattle, the writers next tried a product consisting of six strains of *B. pullorum* which had been grown in plain bouillon at a temperature of 37·5° C. for one month. The culture was killed by heating at 60° C. for one hour in a water bath and then carbonised to 0·5 per cent. The organisms were not removed from the medium, and this product was employed in all subsequent tests.

TABLE V.—TESTS WITH KILLED BOUILLON CULTURES.

Fowl No.	Œdema after 3 hours, Sept. 2.	Œdema after 24 hours, Sept. 3.	Œdema after 48 hours, Sept. 4.	Autopsy.	Culture from ovary.	Agglutination 1 : 100.
73	Marked	Marked positive	Positive..	+	+	+
77	Considerable....	Slight	Trace ..	+	+	+
186[1]	Slight	—	—	0	0	0

[1] Control.

On September 2, fowls 73 and 77 and control fowl 186 were injected with 0·1 c.c. As shown in Table V œdema was present at 24 hours in fowls 73 and 77 and entirely absent in control fowl 186.

On September 20 the following birds were injected in the wattle with 0·1 c.c. of the same bacterial product as used in the preceding test: Fowls 73, 77, 78, 79, 81, 82, and controls 55, 74, 88, 89, 90, 92, 97, 98, and 99. The results of the test are shown in Table VI.

TABLE VI.—FURTHER TESTS WITH KILLED BOUILLON CULTURES.

Fowl No.	Œdema after 24 hours, Sept. 21.	Œdema after 48 hours, Sept. 22.	Autopsy.	Culture.	Agglutination 1 : 100.
73	+	+	+	+	+
77	Slight....	Slight....	+	+	+
78	+	do.	+	+	+
79	+	+	+	+	+
81	+	+	?	+	+
82	+	Slight....	?	—	+
55[1]	—	—	0	0	Not tested
74[1]	—	—	—	—	—
88[1]	+	Slight....	+	+	+
89[1]	—	—	—	—	—
90[1]	—	—	0	0	Not tested.
92[1]	—	—	0	0	Do.
19[1]	+	—	—	—	—

[1] Controls.

On September 23, the following fowls were killed by bleeding and blood was saved for agglutination tests. Autopsy notes follow:

Fowl 73. A hard, tumourlike-mass about an inch in diameter is attached to the ovary by fibrous threads and vessels. Other small ova show typical appearance of pullorum infection. *Bacterium pullorum* was recovered in pure culture from the ovary.

Fowl 77. Ovary contains one ovum the size of a pea, having the appearance of an old pullorum ovum. *B. pullorum* was obtained in pure culture.

Fowl 78. One ovum the size of a pea and having characteristic colour of those with pullorum infection. Also several smaller similar ones and a cyst the size of a hickory nut, which is filled with a colourless fluid. *B. pullorum* was obtained in pure culture from the ovum.

Fowl 79. Ovary contains a number of typical pullorum ova. Pure culture of *B. pullorum* was obtained.

Fowl 81. Ovary contains large ova, apparently normal. There are some small brownish ova that may or may not be infected. Liver contains a few necrotic spots. Cultures from both liver and ovum gave negative results.

Fowl 82. Large ova, apparently normal. Some small brownish ova that may or may not be infected. Liver contains a few whitish spots. Cultures from both liver and ova gave negative results.

On September 24, the following control birds were killed by bleeding, and serum was saved for agglutination tests: Fowls 86, 74, 88, 89, 97, 98, and 99. All were normal, and cultures were negative except for fowl 88, which had reacted to the wattle test. This bird was found to possess a typical pullorum ovary, and yielded a pure culture of *Bacterium pullorum*.

SUMMARY OF THE TESTS WITH ARTIFICIALLY INFECTED BIRDS.

In the course of the experiments, 32 birds that had been exposed to infection by injection of live cultures were employed. When tested for the first time 29 of these, or 90 per cent., revealed œdematous swellings rated as either slight or positive at 24 hours after injection with the diagnostic agent. When read at a 48-hour interval, 23, or 71 per cent. of the same birds gave reactions rated as either slight or positive. Thus, the 24-hour interval yielded the largest percentage of reactions. Practically all birds, both those inoculated and controls, exhibited a swelling shortly after injection, and therefore no diagnostic value has been attributed to swellings observed before the lapse of 24 hours.

Three birds gave negative readings at both 24 and 48 hours. Autopsy of two of these revealed unquestionable lesions of pullorum infection, from which the organisms were obtained, while in the third one the lesions were questionable and no culture was obtained. Thus the test failed to detect 6 per cent. of the birds in which lesions were found.

In all but two cases the same birds were re-tested after an interval of 7 or 8 weeks. Of the 30 birds re-tested 22, or 73 per cent., gave a reaction rated as either a trace, slight or positive, at 24 hours on the second test. At 48 hours on the second test only 8, or 26 per cent., displayed reactions rated as a trace, slight, or positive. Further, 8 birds, or 26 per cent., showed no reaction at either 24 or 48 hours. It is evident that a re-test after an interval of about 8 weeks is far less reliable than a first test.

Of the 32 birds tested, autopsy revealed unquestionable lesions in 18, or 56 per cent. In 8, or 25 per cent., the lesions were regarded as questionable. In 6 birds, or 16 per cent., no lesions were found, although all were positive to the test at 24 hours.

Twenty-six controls were tested for the first time. These had been gathered from various sources and there was no assurance that they were free from infection. Of these, 5 at 24 hours after injection displayed swellings rated as slight or positive and 4 displayed the same condition at 48 hours. At autopsy 2 were found to be infected, and 1 through accident was not examined. No lesions were found at autopsy of 2; however, 1 of these came from the same flock as one of the unquestionably infected controls, and had been in the same cage as the infected bird.

While agglutination tests were made on serum drawn from inoculated birds, after injection with the diagnostic agent, and the results appear in the various tables, it is realised that agglutination would naturally be expected as a result of the various injections. We have observed that as a result of the artificial infection with cultures of *Bacterium pullorum*, the agglutinating value of the serum of these birds varied within a wide range. Some birds gave an agglutination at a dilution of 1 : 1,000, while others that had been repeatedly injected with the test fluid gave no agglutination, owing to the strong bacteriolytic of their sera, presumably resulting from the various injections. Negative control birds after one injection with the test fluid gave an agglutination titer of 1 : 50.

The disadvantages of work with artificially infected birds, due to the large amounts of culture injected and to the severe reactions resulting, were thoroughly realised, and work with naturally infected birds was undertaken.

FIELD TRIALS OF THE INTRADERMAL TEST.

Through the courtesy of the Connecticut agricultural experiment station, opportunity was afforded to apply the intradermal test to two flocks tested at the same time by Dr. L. F. Rettger by the agglutination method.

One flock of 231 birds injected on February 28, 1916, contained at the time over 40 birds showing more or less evidence of swelling of the wattles due to frostbite, while six others showed very slight swelling attributed to the same cause. When examined 38 hours after injection none was regarded as showing reaction to the intradermal test. One bird gave a reaction to the agglutination test and was killed by the owner before arrangements were made to retest by the intradermal method. However, the owner had made an autopsy and reported that he regarded the bird as infected.

In the second flock in which work was done the Conecticut Agricultural Experiment Station tested 50 birds in the regular routine work of testing. Of these one reacted to the agglutination test and failed to react to the intradermal test when examined 46 hours after injection. A number of birds showed slight abnormal conditions, regarded at the time as due to frostbite, but noted in connection with the problem of determining the least amount of swelling to be regarded as a significant intradermal reaction, under the conditions in question.

The bird that gave a positive reaction to the agglutination test was retested by both methods about a month later by Dr. Rettger. At 24 hours after injection the wattle was swollen to about 2·5 times normal thickness, and when observed at 48 hours the swelling was 1·5 times normal. An agglutination test made at the same time also gave positive results. It is probable that the failure of the intradermal test when used the first time was due to some error in technique. Further, it is the belief of the writers that readings should be taken at about 24 hours, and not as late as 36 and 48 hours, as in these trials.

In the same flock the intradermal test alone was applied to about 100 birds, and those showing any enlargement of the wattle at 46 hours were tested by the agglutination method by Dr. Rettger. The size of the swelling following the intradermal injection is indicated as nearly as possible by arranging them in order of decreasing size from the top to the bottom of the list. Here, again, cognisance was taken of every degree of swelling, without implying that the slighter swellings were significant.

TABLE VII.—COMPARISON OF INTRADERMAL AND AGGLUTINATION TESTS.

Fowl No.	Intradermal test.	Agglutination test.	Fowl No.	Intradermal test.	Agglutination test.
93	Whole wattle swollen, ×3 droops	—	66	Swelling and drooping of feathered skin at edge of wattle	—
76	Whole wattle swollen, ×3	+			
77	Lower half swollen, ×3........	+	52	Trace of swelling at lower edge of wattle	—
73	Swollen, ×2...................	—			
72	Swollen, ×2...................	(?)	99	Swelling possibly due to traumatism, as wattle is very blue ..	—
96	Swollen, ×2...................	—			
29	Lower half swollen, ×2	—	60	Questionable swelling of feathered skin at edge of wattle	(?+
59	Lower half swollen, ×1·5......	—			
81	Lower half swollen, ×1·5......	—	95	Trace of swelling on posterior half of wattle	—
100	Lower half swollen, ×1·5......	—			
97	Lower half swollen, ×1·5......	—			

The results were particularly discordant in the case of fowl 93, which had been placed at the top of the list as showing the best intradermal reaction, while it failed to give a reaction to the agglutination test. In view of the discrepancy, Dr. Rettger obtained the bird in question, together with three others, for retest and autopsy. The results are shown in Table IX :

TABLE IX.—COMPARISON OF RE-TESTS AND AUTOPSY FINDINGS.

Fowl No.	Intradermal test.		Agglutination test.	Condition of ovaries at autopsy.
	24 hours.	48 hours		
93........	Slight	—	—	Normal
72........	Swollen, + 2 ..	Swollen + 15 ..	—	Do.
29........	—	—	—	Normal (small
60........	—	—	—	Normal

The result of the re-test and autopsy of birds 93 and 72 is not wholly satisfactory. The repetition of the reaction in both cases is significant, but, on the other hand, the results of the agglutination test and autopsy leaves the matter inconclusive.

TRIALS BY OTHER INDIVIDUALS.

In several instances the test product was sent to interested individuals on request. One report on the results was received in which 1,301 birds were tested and 78 gave a positive reaction. The latter were retested by the agglutination method, and 70 gave a positive reaction.

COMPARISON OF RESULTS OF AGGLUTINATION AND INTRADERMAL TESTS ON NATURALLY INFECTED BIRDS.

Through the assistance of Roy E. Jones, we located and purchased 47 birds that had given positive or questionable agglutination tests, applied by the Connecticut Agricultural Experiment Station. These, together with nine controls, were injected for the intradermal test on June 23, 1916, and readings were taken at 24 and 48 hours.

Of the birds reported positive to the agglutination test applied by the Connecticut station, there was total agreement in 28, or 70 per cent. of the cases in that they also gave positive intradermal test as determined 24 hours after injection and displayed unquestionable lesions when eventually slaughtered. Of those reported positive to the agglutination test, 30, or 75 per cent., revealed lesions at autopsy.

Thirty-five birds gave positive reactions to the intradermal test. Autopsy revealed that of these 29, or 83 per cent., possessed undoubted lesions, in 5 the lesions were questionable, and in 1 no lesions occurred. Of those reported positive to the agglutination test, 3 birds, or 7 per cent.

failed to react to the intradermal test, and autopsy revealed no lesions. On the other hand, 2 birds, or 5 per cent., that had given positive agglutination tests, gave negative intradermal tests, and autopsy revealed lesions. Thus, the percentage of absolute failures of each test as judged by the other test and by the autopsy findings were very similar in amount.

Seven birds had given questionable agglutination tests. Of these 3 were negative to the intradermal test and negative at autopsy. One reported questionable gave a positive intradermal reaction and autopsy revealed lesions. The intradermal test on the other 3 yielded positive, negative, and questionable results, respectively, and autopsy of all 3 furnished inconclusive information.

Of the nine controls, one displayed a marked reaction at 24 hours, consisting of a swelling of the wattle to three times its normal thickness. Autopsy revealed undoubted lesions, and a pure culture of *Bacterium pullorum* was isolated from the ovary. Four others displayed traces consisting of swelling of the lower border of the wattle to about twice the normal thickness. On autopsy, one of these was found to contain undoubted lesions and a pure culture of *B. pullorum* was obtained.

The examination of the wattles at 48 hours revealed swellings varying from a trace to positive is only 22 birds, or 46 per cent., of those tested. This result compared with the 28 birds regarded as positive at 24 hours and verified by subsequent autopsy, again indicates that 48 hours is too long to secure all the positive reactions. Among the controls only one displayed any swelling whatsoever, and this case proved an autopsy to be positive.

On June 26 all the 47 birds and 9 controls were reinjected and examined 5 hours later. At this time every bird, including controls, displayed a swelling varying in the different individuals from a trace to five times the normal thickness. The observation merely emphasises the fact of the occurrence of a non-significant swelling following injection with the diagnostic agent.

At 24 hours 39 birds displayed swelling of the wattle varying from a trace to enlargement to five times the normal thickness. Autopsy revealed undoubted lesions in 30 of these, questionable lesions in seven, and no lesions in two. Total agreement between the results of this reading, the agglutination test, and autopsy findings occurred in 70 per cent. of the birds tested. In two cases, or 4 per cent. of the birds, the positive readings by the agglutination test were not supported by the negative results of the intradermal test and the autopsy. In one case, or 2 per cent., negative results of the intradermal test were contradicted by the positive results of agglutination test and autopsy.

Thus, the results yielded by the first and second 24-hour readings of the test on supposedly infected birds vary but little.

The results yielded by the test on the control birds were perfect, as confirmed by the autopsy. The only two birds that displayed traces of swelling proved on autopsy to be infected.

The fact that the results of the agglutination test, intradermal test, and autopsy are in complete agreement in 70 per cent. of the cases, coupled with the fact that the absolute disagreements are very small, indicates that the two tests are equally accurate.

The results obtained at the autopsy of the birds emphasise the difficulty of determining a standard for comparison of the accuracy of the two tests under trial, Thirty-one cases, or 64 per cent., were found to possess unquestionable lesions consisting of the angular ova characteristic of the infection. All of the cases had given positive reactions to one or both tests. In nine cases, or 10 per cent., the autopsy was inconclusive in that there were present only very small dark ova or cysts. Of these nine questionable cases three had given questionable agglutination readings but positive intradermal reactions. In two cases the agglutination and intradermal tests disagreed. In four cases both tests had given positive results.

SIGNIFICANCE OF SWELLING AS AN INDICATION OF A REACTION.

In determining the significance in diagnosis of an œdematous swelling of a wattle one is confronted with the fact that in all birds such swelling occurs shortly after injection. The problem is to determine the point of time after injection to read the test when this preliminary swelling has disappeared, yet not too late to escape observing a significant œdema. The tests on birds in the laboratory, and probably also those in the field, indicate that 48 hours is too late. While some observations on birds in the field made during freezing weather would indicate that slight swellings should not be considered, yet the entire experience with birds in the laboratory indicates that even a trace may be indicative of a positive reaction. Some few cases would indicate that a 24-hour reading might give false results due to the inclusion of some cases in which the preliminary non-significant swelling had not quite subsided. At present, the 24-hour interval has given the best results, but the examination of a series of readings at 30 hours would be desirable.

VARIOUS BIOLOGIC TESTS.

During the course of these experiments several attempts were made to produce a reaction to the diagnostic agent by injection into the comb, but no satisfactory results were obtained. The ophthalmic, palpebral, and subcutaneous tests also failed to produce a reaction.

Also limited complement-fixation tests on the blood serum of infected fowls gave uncertain readings.

SUMMARY AND CONCLUSIONS.

A killed culture of *Bacterium pullorum* grown for about a month and held for several weeks before use and without further treatment other than carbolising, has given the most satisfactory results.

It seems to be a fact that the œdematous swelling resulting from the injection of this product into the wattle of a fowl, when observed at a proper time interval, is an indication of the presence of infection of *B. pullorum* in the fowl.

Our experience to date with readings at various time intervals leads to the conclusion that the 24-hour interval has given the most accurate results. However, it seems desirable to test on a large number of birds the accuracy of readings made at a slightly longer interval.

The weight of evidence indicates that any perceptible swelling of the wattle should be regarded as significant. A second intradermal test made at an interval of four days gave results varying but little from the first test. Others made at intervals up to two months gave less accurate results the second time. Thus, there is no advantage in retesting.

Of birds artificially infected with the disease and tested in the laboratory, in round numbers 90 per cent. gave positive reactions ; and in 6 per cent. the test failed to indicate a reaction when lesions were present. In 3 per cent. no reaction occurred and no lesions were present.

In a field test on 231 birds made simultaneously with the agglutination test, the intradermal test at 38 hours failed to detect one case reported positive to the other test. In a second flock of 50 birds in which the two tests were compared, the intradermal test when read at 46 hours failed to indicate one case that was detected by the agglutination test. Another group of about 100 birds tested under unfavourable conditions gave less satisfactory results.

Forty-seven birds that had been tested by the agglutination method by the Connecticut Agricultural Experiment Station in the field were purchased for experiments with the intradermal test. Of these, 40 had given positive reactions to the agglutination test and seven doubtful reactions. There was complete agreement between the agglutination test, the intradermal test, and autopsy findings in 70 per cent. of the cases. The agglutination test reported positive in three cases, or 7 per cent., was not confirmed by the intradermal test nor by the autopsy findings. The result of the intradermal test was negative in two cases, or 5 per cent., when it was not confirmed by the positive agglutination test and autopsy findings. Thus the percentage of absolute failures of each test was small and very similar for both tests.

Autopsy does not furnish an absolute standard for comparing the accuracy of tests. Seventy-two per cent. only of naturally infected birds that had reacted to one or both tests were found on autopsy to be unmistakably infected.

The intradermal test detected the presence of infection in four of the 34 control birds injected in connection with the tests in the laboratory on artificially and naturally infected birds.

In a field trial not made by the writers, 1,301 birds were tested intradermally and 78 reacted. Of these 70 reacted to the agglutination test made subsequently.

The intradermal test has already shown sufficient promise to warrant further extensive trials in the field in comparison with the agglutination test.—*Bulletin* 517, *U.S.A. Dept. of Agriculture.*

HOG CHOLERA.

THE experience of past years having proved conclusively that the feeding of uncooked garbage is a frequent cause of hog cholera, and has been responsible for many serious outbreaks of the disease, it was decided to limit this practice to those who are willing to cook the garbage and to maintain their hog pens in a sanitary condition. The following regulation was passed and is now law:—

> "The feeding of swine upon garbage, either raw or cooked, obtained elsewhere than on the premises where fed, is prohibited, unless special permission in writing is first obtained from the Veterinary Director General."

Following the passing of this regulation, our inspectors have endeavoured to have all persons engaged in the business of garbage feeding apply for a licence to continue the same. No charge is made for a licence, but licences are issued only to persons having the necessary appliances for cooking the garbage, and who maintain their premises in a sanitary manner.

A large number of licences have been issued, and the supervision which this system enables us to exercise over this business is already showing good results. No prosecutions have yet been undertaken of parties who continue to feed garbage without a licence, but it will probably be necessary to do so unless the law is generally obeyed.

Another important change in our method of handling hog cholera has resulted in reducing the losses from the disease to a considerable extent. This is the use of serum to save as many as possible of the hogs in an outbreak. We are using the "serum alone" method to immunise hogs which have been exposed to infection, but have not yet developed the symptoms of the disease. Under former methods, these hogs were slaughtered and their carcasses destroyed, so as to stamp out the infection as soon as possible. Now we are able to save a large number of hogs which are fattened under quarantine, and subsequently slaughtered under inspection for pork. We are not permitting these immunised hogs to remain alive for breeding purposes, as it is likely that some of them may be immune carriers of the disease and thus originate fresh outbreaks.

The serum is injected by our own inspectors without cost to the farmer, and the serum is obtained from highly-recommended manufacturers in the United States. For many reasons this appears to be more desirable at present than to engage in its manufacture at our laboratory here.—*Report of Veterinary Director General for Canada*

NEW MODE OF FISHING.

Scrap Book (Printed by John Pierpont, Boston, Author of "Airs of Palestine), published 1818.

"SEVERAL years ago, a farmer who resided in the immediate neighbourhood of Lochmaben, Dumfriesshire, kept a gander, who had not only a great trick of wandering himself, but also delighted in piloting forth his cackling harem to weary themselves in circumnavigating their water lake, or in straying amidst forbidden fields on the opposite shore. Wishing to check this vagrant habit, he one day seized the gander just as he was about to spring into his favourite element, and tying a large fish-hook to his leg, to which was attached part of a dead frog, he suffered him to proceed upon his voyage of discovery. As had been anticipated, this bait soon caught the eye of a greedy pike, which, swallowing the deadly hook, not only arrested the progress of the astonished gander, but forced him to perform half a dozen somersaults on the surface of the water. For some time the struggle was most amusing, the fish pulling and the bird screaming with all its might, the one attempting to fly and the other to swim, from the invisible enemy, the gander the one moment losing and the next regaining his centre of gravity, and casting between whiles many a rueful look at his snow-white fleet of geese and goslings, who cackled forth their sympathy for their afflicted commodore. At length victory declared in favour of the feathered angler, who, bearing away for the nearest shore, landed on the smooth, green grass one of the finest pike ever caught in the Castle loch. This adventure is said to have cured the gander of his propensity for wandering; but on this point we are inclined to be a little sceptical—particularly as we lately heard that, at the reservoir near Glasgow, the country people are in the habit of employing ducks in this novel mode of fishing. We cannot, to be sure, vouch for this last fact; but in the days of yore hawks were taught to bring down woodcock and muirfowl, and why might not a similar course of training enable ducks to bring up pike and perch?"

CODE OF ETHICS FOR MEMBERS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.

Section 1.—Members of this Association are expected to conduct themselves at all times as professional gentlemen. Any flagrant violation of this principle shall be considered by this Association as unprofessional conduct, and on written charges filed with the Executive Board may subject the violator to suspension or expulsion as provided in Article 5, Section 7, of the Constitution.

Section 2.—No member shall assume a title to which he has not a just claim.

Section 3.—No member shall endeavour to build up a practice by undercharging another practitioner.

Section 4.—In all cases of consultation it shall be the duty of the veterinary surgeon in attendance upon the case to give the opinion of the consulting veterinary surgeon (whether favourable to his own or otherwise) to the owner of the patient in the presence of all three. In case of the absence of the owner the veterinary surgeon consulted, may, after giving his opinion to the attending veterinary surgeon, transmit it in writing to the owner through the medical attendant. It shall be deemed a breach of this code for a consulting veterinary surgeon to revisit a patient without a special invitation by the attending veterinary surgeon or agreement with him.

Section 5.—In advertising, the veterinary surgeon shall confine himself to his business address. Advertising specific medicines, specific plans of treatment, or advertising through the medium of posters, illustrated stationery, newspaper puffs, etc., will not be countenanced by this Association.

Section 6.—Any person who shall advertise or otherwise offer to the public any medicine, the composition of which he refuses to disclose, or who proposes to cure disease by secret medicines, shall be deemed unworthy of membership in this Association.

Section 7.—It shall be deemed a violation of the code of ethics for any member of this Association to contract with or through the officers of any livestock insurance company for the professional treatment of the members' stock so insured; but this rule shall not prevent any member from becoming an examiner of risks and acting in the capacity of an expert for the same.

Section 8.—Each member shall observe the code of ethics adopted by this association and be answerable to the Executive Board for any breach of the same.

URETHRAL CALCULUS.

I RECEIVED a call about 10.30 one night to see a horse very sick with "colic." On my arrival I found a 1,500-pound horse showing symptoms of abdominal pain. This horse was used for light truck work, but as this was Sunday he had made an eight-mile trip to the country, going in the morning and returning that evening, when it was found he refused feed and water. An examination for bowel trouble showed that, if such were the case, it had not reached a stage to cause alarm. Aside from bowel symptoms, there were other very noticeable signs, as violent straining, with protrusion of the penis and dribbling of a few drops of urine. I was told by the attendants that a few weeks previously he had shown some trouble voiding urine, but that after cleaning his sheath this disappeared. On rectal examination the rectum was empty, but I immediately noticed the greatly distended bladder, which, when palpated, caused the animal much pain. Examination of the urethra, so far as was possible in a heavily muscled horse, revealed nothing. On passing the catheter, a hard object was found obstructing the urethra, about seven inches below the arch of the ischium.

A calculus was at once suspected, and the horse was taken to the hospital and prepared for urethrotomy, which was carried out as follows:—

With the subject confined in the stocks and the use of a twitch and a local anesthetic, sufficient restraint was provided. After careful antiseptic precaution, the assistant passed the catheter and held it against the obstruction. A two-inch incision was made directly over the obstruction, which was now easily palpated. The incision was carried on down through the connective tissue and muscles through the urethral wall until the removal of a calculus was effected and the immense quantity of urine was allowed to escape. Drainage was then provided by making the lower termination of the incision, so that the skin incision extended an inch below the opening in the urethra. It was then closed with four interrupted sutures.

Attention is called to this case for three reasons:

1. Because it is a case not seen every day.
2. The operation was performed with the subject standing.

3. It shows how acceptance of the owner's diagnosis or a hasty, careless examination might have been the cause of embarrassment later.

Five weeks later I was called again to see the same horse, and again found a calculus that had passed the location of the first one, so that it had to be removed through an incision in the body of the penis. This calculus was as large, if not larger, than the first, thus showing that the first operation caused no stricture. The horse is now making a nice recovery. I might add that in both instances rectal examinations were negative. The question arises, "How long does it take for a urethral calculus to develop?"—A Doctor in the *A. J. V. M.*

Translations.

ON THE TREATMENT OF LYMPHANGITIS IN THE HORSE.

By Veterinary Major CHAUSSÉ,

Of the Heavy Artillery Regiment.

The *R.G.* of October 15 published a very interesting article by Messieurs Haan and Auger on prevalent affections among our effectives during this war. Their rapid extension and spread, as these authors remark, makes it appear certain that quite a number of veterinary surgeons had never met with epizootic and ulcerous lymphangitis before 1914. My intention in publishing these lines is not to disclose or lay claim to any infallible treatment, but to describe a process which I used at Maroc in 1913, and which up to now has given me every satisfaction in localising lesions on a subject affected.

Messieurs Haan and Auger declared in their article that "whatever the drug used by them, they have obtained better results by cauterisation," and they cite the example of Charmoy, who simply surrounds the lesions with a double rank of puncture fire-points, followed by blistering. The process I adopted is on the same lines, but whereas Charmoy puncture fires, I line fire in the following manner:—

1. After having widely clipped the affected region, cauterise the lymphangitic nodes first with a point firing iron, and then with a budding iron.

2. Fix the limit of the cord above and below the nodes (even if the region is other than that of the members) by a very deep firing line with section of the skin. I consider this method is equivalent to the surgical intervention which extirpates the cord, but it does not offer the same inconveniences, deep and extensive sloughing; production

of easily-soiled wounds in the rudimentary establishments often existing on the front.

3. Delimitation of the invaded region by two firing lines not very deep, uniting the two preceding ones and surrounding the part as well as the cord or the lymphangitic nodes.

4. After care, warm antiseptic washes, sulphate of copper solution on the nodes. In the case of localisation on the lower part of a limb (below the knee or the hock) I place above the last ulcer a single circular and very deep firing line—cauterisation of buttons and same treatment as above. Baths of running water when it has been possible to give them have given me excellent results.

5. Renew the firing lines subsequently if it is necessary. On numerous horses and mules which have been submitted to this treatment I have only exceptionally seen the irruption of lesions beyond the limits of the firing lines. An important recommendation to terminate this recital is that *it is necessary to act early* on the appearance of the first bud; cauterise immediately as I have described, and if a second arises, apply the complete treatment.

As a preventive measure I cauterise lightly with the firing iron and in a systematic way all wounds, whatever be their nature, in a subject belonging to any formation where cases of lymphangitis break out. Of course, one naturally takes the sanitary measures prescribed in similar cases—preliminary malleination, isolation, and disinfection.

The process by line firing which I indicate is simple and at the command of all; one can operate on the animal standing or cast, according to the character of the patient; one can supplement it by any internal treatment preferred. For my part I have used for a long time intravenous injections of an isotonic solution of iodide of potassium. Since this drug has gone up to an enormous price, and in view of the difficulty in obtaining it, I have ceased all internal treatment and to my surprise the results have been identical. I attribute them to the early intervention that I practise.

The prognosis in lymphangitis is grave, say Haan and Auger. I am of their opinion, but this gravity is due to slaughtering *en masse* in view of the lesions present on evacuated animals; too tardy evacuations, these authors rightly declare, and which consequently for economic reasons necessitate the sacrifice of the animal.

Haan and Auger urge that the animals be evacuated when the lesions are little extensive. By acting as I have indicated I believe that the end desired will be obtained; it is permissible to attempt the cure of affected horses on the front when one wishes to conserve the unit on account of its value and in cases of non-success to evacuate them afterwards with lesions localised between limiting firing lines.—*Rev Gén. de Méd. Vét.* G.M.

Reviews.

MEAT INSPECTION PROBLEMS, WITH SPECIAL REFERENCE TO THE DEVELOPMENTS OF RECENT YEARS. By William J. Howarth, M.D., D.P.H., M.O.H. for the City of London. Demy 8vo, pp. viii + 143; illustrations, two. Price 6s. net. Publishers: Baillière, Tindall & Cox, 8, Henrietta Street, London, W.C.

This is an excellent little book, that will probably be well perused and have a good circulation by reason of the clarity and conciseness of the author's remarks on the subject of certain difficulties that arise in meat inspection. In his preface he writes: "Decisions in cases of tuberculous infection are the constant duty of meat inspectors in this country, and in this connection an attempt has been made to furnish a reasoned argument in support of such action as is advised."

There are five chapters and four appendices in the work. Chapters II, III, IV and V were delivered as the Milroy Lectures before the Royal College of Physicians in 1917.

The subject matter deals with the Development of Meat Inspection, General Administrative Problems, the Tuberculosis Problem as Affecting Cattle, the Tuberculosis Problem as Affecting Pigs and Imported Meat. In the Appendices the Lymphatic Glands, the Inspection and Manner of Packing Imported Offal and Boneless Meat, a Note on Certain Conditions, and the Sale of Sterilised Unsound Meat are the subjects dealt with.

Perhaps Chapter II is one of the most important in the book. We think that knowledge as regards meat inspection in this country is considerably ahead of the administrative tendency and inclination to establish widespread and uniform meat inspection or, indeed, to set up any system of universal meat inspection at all. A large part of the book, as is only natural, deals with tuberculosis in cattle and swine, and the author has much that is very interesting and practical to put before his readers. He seems to think that there is little hope of establishing a three-grade system of selling meat in this country, but economic conditions may force us to adopt such a procedure in the future and anyway what is largely done in America, although not quite in the same way as under the Freibruk system in Germany, ought not to be altogether ruled out for this country. We know we are insular in our ideas, but perhaps after the war we shall become more pliable and cosmopolitan. The arguments advanced against the sale of sterilised meat in this country are more prominently put forward than those in favour of it. We think much might to be said on the other side of the question, especially at the present time.

The doctor has certainly produced a book of exceptional interest to veterinary surgeons, meat inspectors, and medical officers of health,

and we trust that many of our body will get the book and read it. Its perusal cannot help but be beneficial to all taking an interest in the subject.
G. M.

VETERINARY REVIEW, FEBRUARY, 1918.—Editor: O. Charmock Bradley, M.D., D.S.C., M.R.C.V.S. Issued quarterly, price 3s. 6d. Annual subscription 10s. 6d. Published by W. Green and Son, Ltd., London and Edinburgh.

"Excellent in every way" is the verdict that may again be written on the *Veterinary Review*. It contains an article by Sir William Osler entitled "Essaide Bibliographie Hippique." which is very timely and appropriate, and coming from such an authority it is especially gratifying and encouraging to us. The author indicates the chief reason why we have never attained the high plane reached by the veterinary profession in France. The writing is really a review of a book published after fifteen years' labour by General Mennessier de la Lance, which gives a detailed description of the works published or translated in Latin or French on the Cavalry Horse. Another article, which is anonymous, on "The Birth of Modern Surgery," is well worth reading.

The review contains 138 pages, comprising, besides the papers previously named, abstracts, reports, reviews, notes on books, and a bibliography.

All those who wish to keep up to date in conversance with modern thought and literature bearing on veterinary matters must take the *Review*. There is not a domain in our activities that is not touched upon by it, and it ought to stimulate beyond measure that progress and real life among us that we all desire, but do not all take measures to further.
G. M.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone : Gerrard 4646. Telegrams : "Baillière-Rand, London."

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THE

VETERINARY JOURNAL

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GLADSTONE MAYALL, M.R.C.V.S.

APRIL, 1918.

Editorials.

THE PROFESSIONAL "ENTENTE CORDIALE" IN FRANCE, ITALY AND AMERICA.

In another column we publish a resumé of the proceedings of a conference between British and French veterinary officers at a place "somewhere in France," the cordiality of which demonstrated very conclusively that the *entente cordiale* exists as strongly as ever between our confrères and ourselves, and that the test of true and close relationship during the terrible war has strengthened (if possible) the bond of good fellowship which previously existed. The generous way in which work done by the British was acknowledged by the French, and *vice versa*, proves that in science there is no such thing as jealous rivalry, and that each works equally for the common good. This spirit is the correct one, and the motto of "The greatest good for the greatest number" applies to nothing of greater importance than to the fight against disease. Disease germs acknowledge no nationality, and no clear rules of war, and in the struggle against them it is necessary that no such thing as selfishness exists, but everyone must "do his bit," and, what is equally important, give it to the world.

Conferences such as this one cause interchange of opinion and do inestimable good; for, even if the results attained are not conclusive, they afford mutual encouragement; and, what is more, they give much food for thought and prevent much loss of time in "sidetracks"; workers being helped along by profiting from the freely acknowledged mistakes of others. Besides which they bring forward new ideas, new devices, new methods of working, and lastly, but by no means least, they make new friendship.

On another page we publish a brief notice of another kind of *entente cordiale* in which our Italian *confrères* also give proofs of the good fellowship which exists between the members of the profession in the two nations. The universal experience of officers of the Army Veterinary Corps during this war has been that nothing could have exceeded the welcome and good fellowship which have been extended to us by our Continental Allies, and now that the Americans are with us they too will share it. The wish expressed by Professor Liautard, in the extracts from a letter published in another column, that American confrères may be admitted to membership of the newly-formed "Somme Veterinary Medical Association" had only to be expressed to be granted. It scarcely needs to be said that they will be welcomed, and, as Professor Liautard puts it, "it will create a pleasant intimacy which will prove of great professional service."

Friendships made in wartime, and under war conditions, are lasting ones, and can be looked upon as being amongst the things which help to counterbalance its terrible horrors and realities. Science never stands still, and the experiences gained now are being utilised as far as is possible during the present, and carefully stored up for future use in the never-ending contest against diseases whose victims are counted in much larger numbers than the actual sufferers from shot or shell. Let us each think of this, and there will be many benefits manifested in the future as the outcome of a series of years when all seemed black and terrible. The true scientist, in our profession as well as of every other, will ever be on the watch for the silver lining of the cloud, and the silver lining is always there, and to be found if looked for earnestly.

OUR AMERICAN COLLEAGUES AND THE SOMME VETERINARY MEDICAL SOCIETY.

OUR old and esteemed friend and colleague, Professor Liautard, the *doyen* of the veterinary schools in America, always active in the interests and advancement of veterinary science, having read of the formation of the "Somme Veterinary Medical Association," has written a charming letter of congratulation to his English *confrères*, in which he expresses the hope that now there are many American veterinary officers in France these might be admitted to membership if ever good luck stationed them in the neighbourhood. He says:—

"I take the opportunity to renew my congratulations for the organisation of the Somme Veterinary Medical Association, the promotion of which I have read in the VETERINARY JOURNAL. I wish it all success possible, and shall be glad to know if American *confrères* who might so desire could hope to be admitted. I am sure that it would create a pleasant intimacy, which would prove of great professional service, and it will give me much pleasure to announce the existence of the new Society in the monthly chronicle which I send to the American Journal."

The letter has been forwarded to the President of the Society (Colonel Newsom, C.M.G.), and Professor Liautard can rest assured that if he or any of his American colleagues are stationed in the neighbourhood of the Somme (or indeed any other) Association Meetings of their British colleagues, a real hearty British welcome will be "right there" awaiting them.

OUR ITALIAN COLLEAGUES AND "INTESA AMICHÉVOLE."

ON February 13th, at a garrison town "somewhere in Italy," in which a British Veterinary hospital had become stationed, the military and provincial State veterinary officials (including Professors Torreggiani and Brentana, Capt. Spadoni, Lieut. Vaciago, Signor Sacco, and about twenty others) gave an address and a dinner of welcome to their British colleagues, and a most instructive and pleasant evening was spent. Altogether about thirty members and guests sat down, and the usual loyal toasts to all the Allies were taken in turn, whilst many valuable interchanges of opinion took place. Much useful information was obtained on diseases met with in Italy, diseases from which Great Britain has been for years free, and from which it will be the duty of our profession to safeguard our country after the war. As might have been expected, the *entente cordiale* was well sustained, and nothing could have exceeded the courtesy and kindness of our Italian colleagues. It even compared favourably with the gatherings seen at one of the pre-war meetings of the Central or the Midland Veterinary Medical Societies, and almost carried one back to England again.

Original Communications.

CONFERENCE OF OFFICERS OF THE FRENCH AND BRITISH ARMY VETERINARY SERVICE, HELD IN FRANCE, JANUARY 12TH, 1918.

French Representatives :—

Brigadier-General J. FRAY, Inspector-General, French Army Veterinary Service.
Colonel J. E. R. BERTELOOT.
Major D. BROCQ-ROUSSEAU.
Major E. NICOLAS.
Major V. F. DROUIN.
Lieutenant BOURDON (Interpreter).

British Representatives :—

Major-General J. MOORE, C.B., Director of Veterinary Services, British Expeditionary Force, France.
Colonel A. C. NEWSOM, C.M.G., Deputy-Director of Veterinary Services (Southern).
Colonel E. W. LARNDER, Deputy-Director Veterinary Services (Northern).
Colonel F. W. HUNT, C.M.G., Deputy-Director Veterinary Services, Fourth Army.
Colonel W. J. TATAM, C.M.G., Deputy-Director Veterinary Services, Fifth Army.
Colonel W. A. PALLIN, D.S.O., Deputy-Director Veterinary Services, Third Army.
Colonel E. A. KENDALL, C.M.G., Deputy-Director Veterinary Services, Australian Imperial Forces.
Major H. C. JAGGER, representing Deputy-Director of Veterinary Services, Cavalry Corps.
Major E. J. WADLEY, D.S.O., Assistant-Director of Veterinary Services, Headquarters D.V.S.
Major A. LEANING, D.S.O., Officer Commanding, No. 5 Veterinary Hospital.
Major J. MCARTHUR, Officer Commanding, No. 4 Veterinary Hospital.
Captain E. A. WATSON, C.A.V.C., A.V.C. Bacteriological Laboratory, No. 6 Veterinary Hospital.
Captain R. E. J. DAVIS, Officer in Charge, Sales, Paris (Interpreter).

AGENDA.

Introductory Address by Major-General J. MOORE, C.B., D.V.S.

Address on "Glanders," by Major-General J. MOORE, C.B., D.V.S.

Address on "Epizootic Lymphangitis," by Colonel W. A. PALLIN, D.S.O.

Address on "Ulcerative Cellulitis," by Colonel A. C. NEWSOM, C.M.G.

Address on "Periodic Ophthalmia," by Colonel A. C. NEWSOM, C.M.G.

Address on "Control and Treatment of Mange and other Contagious Skin Diseases," by Major E. J. WADLEY, D.S.O.

INTRODUCTORY REMARKS, BY MAJOR-GENERAL J. MOORE, C.B.

MONSIEUR l'Inspecteur-Général Fray and Officers of the Service Vétérinaire Française,—

In February last I suggested to our General Headquarters that the Officers of the French and British Veterinary Services should meet in Conference to discuss matters of professional interest appertaining to animals of our respective Forces. This was agreed to by both French and our own General Headquarters, but, unfortunately, the operations of the summer made postponement necessary.

I had long felt that to come with our Armies to your country and to remain comparative strangers to you, both in reality and in a professional sense, was not as it should be, but that a spirit of friendship and comradeship should exist and be developed between us. It is true that we have met individually on occasions, and have exchanged views to a certain extent on paper, but to my mind a broader *entente* is indicated, and certainly would be more fitting. We, as professional veterinary surgeons, have the opportunity of our lives to study the dire diseases which beset animals on active service. It goes without saying that exchange of opinion with regard to these diseases is beneficial, but occasion may arise when a common front or alliance against them for their proper control and suppression becomes necessary. At least, that we should know what each is doing is advantageous.

It is, therefore, with the greatest pleasure that I welcome you here to-day, and I trust that such gatherings will be continued as opportunity presents itself, and that we may profit by each other's experiences.

Your General Headquarters has expressed a wish that a Report both in French and English should be drawn up after the Conference, and that the conclusions arrived at should be circulated under authority. This I will arrange to have carried out.

I would prefer that Conferences between us should not be made burdensome, but should rather take the form of informal gatherings, because so much more information can be obtained by seeing our work and by ordinary enquiry. There are also so many points to discuss that, for this first Conference, at least, we can only go into generalities.

I have noted down the following diseases for discussion:—

I. Glanders.
II. Epizootic Lymphangitis.
III. Ulcerative Lymphangitis of Nocard; or
  Ulcerative Cellulitis, as we call it.
IV. Periodic Ophthalmia.
V. Mange.

To form the basis of the discussion of these diseases, I have asked several of my officers to draw up a few short notes in connection with each, and which I now place before you.

I propose that we should devote at most 45 minutes for the discussion of each disease.

I.—GLANDERS AND FARCY.

By Major-General J. Moore, C.B., F.R.C.V.S.,
Director of Veterinary Services.

Glanders—one of our bugbears of previous wars—has not in this campaign been the cause of any real trouble, and, with mallein to aid us in diagnosis, it never will.

For nearly a year after the outbreak of hostilities our Force was singularly free. Then towards the latter part of 1915 the frequent reaction to mallein experienced amongst animals evacuated from units at the Front to Veterinary Hospitals, and further cases discovered in units to which such reactions were referred, challenged our security, and I determined to test the whole of our Force during the comparative inactivity of the ensuing winter. This was carefully carried out by the intra-dermo-palpebral method of mallein testing, kindly introduced to us by the French Veterinary Service and demonstrated by Professor Douville, who was specially sent to us for that purpose. Since that time we have enjoyed comparative immunity.

Each advance into territory taken from the enemy has been productive of a crop of reactors to a limited extent, but under our system of control it is not possible for the disease to gain any ground.

Our procedure of control is as follows:—

(*a*) Routine weekly inspections by Veterinary Officers of units for any evidence of contagious disease, and a certificate as to freedom or otherwise recorded on their weekly returns of sick. Test of any suspicious case.

(*b*) Test of all animals evacuated from the Front on arrival at reception veterinary hospitals.
(*c*) A second test of (*b*) fourteen days later.
(*d*) Test of all units or remounts from overseas on arrivals.
(*e*) Reference to units concerned of any reactor for action within the unit, the result of *post-mortem* examination being clearly stated.
(*f*) Test of all animals on discharge from veterinary hospitals and convalescent horse depots to remount depots.
(*g*) Destruction of reactors; retest of doubtful ones.
(*h*) *Post-mortem* of all reactors for evidence as to clinical or "open" signs of the disease.
(*i*) A double test of units at fourteen days' interval when clinical or "open" symptoms have been discovered.
(*j*) Submission of record of test on the accompanying form to Headquarters D.V.S.
(*k*) Usual measures of isolation, disinfection, and administrative control.

The palpebral method of testing is almost exclusively adopted, the old cervical method being followed as a control test in doubtful reactions in animals affected with ophthalmia.

We are unanimous in declaring the palpebral method superior to the sub-dermal cervical method as an eliminating test in the Field. It is much cheaper, reactors are more readily determined, application is easily and quickly carried out, waste of time in taking temperatures is avoided, and it occasions no interference with the work of units.

The danger of occurrence and spread of glanders in veterinary hospitals is reduced to a minimum by the above-mentioned procedure of mallein test and by the organisation of veterinary hospitals into sub-divisions which are self-contained in their stable arrangements; in fact, so far as watering, feeding, grooming, and the common media of infection in glanders are concerned, each line of stable is practically separate and distinct, so that if anything untoward occurs in one line of stabling, spread of disease is very limited and occasions no trouble.

DISCUSSION.

At the conclusion of his address, General Moore remarked that we were very thankful to the French Veterinary Service for introducing the palpebral method of mallein testing. It has been followed ever since, and is likely to continue. After conducting the test of the whole of the animals of the British Expeditionary Force by this method, a very extensive report was drawn up on the subject and sent to the

British War Office. Following this, the palpebral method was adopted in England, and it is believed to have worked very well there. It is certainly an absolutely indispensable method of dealing with glanders, and it could not possibly be done without.

General Fray, before going on to the different points submitted for discussion, said he wished to make a remark on the origin of the intradermo-palpebral method of mallein testing—a really French method. The originator of the method was Major Drouin. Thanks to him, they had been able to get rid of glanders in the French army. Major Drouin was the first to fix the rules of the method.

Major Drouin then gave some personal details as to the origin of the method. He had been called to Greece on a mission, and there, having to grapple with a widespread outbreak of glanders, and under conditions nearly identical with those of war, he felt the necessity for a practical mallein testing method which excluded the taking of temperatures. He eventually decided on a method which depended solely on local reaction obtained from the intra-dermal injection of mallein into the eyelid. He had first tried other regions suitable for the application of this test, but none appeared to be more so than the eyelid. The results were very gratifying. Together with his collaborator, M. Haudinat, Major Drouin communicated his observations to the Société Centrale de Médécine Vétérinaire on July 17th, 1914, which date in point of time was on the eve of the war.

The "instruction" with regard to dealing with glanders in the French Army was drawn out by Major Drouin. It was based on the new method which has since become universal in that army. Major Drouin noted with pleasure that, as a result of a visit of a French veterinary officer, the British Army had adopted it completely on the lines set out in the "instruction" of December 23rd, 1914.

The technique of the method had been fully defined as early as the month of July, 1914, in the communication made to the Société Centrale de Médécine Vétérinaire.

With regard to the period between the two tests, Major Drouin considered that fourteen days was not sufficient, explaining that whereas in laboratory experiments infection was produced by large doses of virus, in natural infection of the animal the doses of infective matter were often very feeble, with the result that the period of incubation notably exceeds fourteen days, and extends sometimes to one month.

Clinical signs of the disease may, therefore, appear between the first and second test. He believed that many disconcerting results would be avoided if three weeks were allowed to elapse between the two tests.

General Moore pointed out that at first the period had been fixed at three weeks for the second test; but in his opinion—based on considerable experience of glanders—the disease may develop in clinical form before three weeks, and it is dangerous to have it appearing thus. The period of incubation varies, and if three weeks were allowed to elapse between first and second tests, a case of clinical glanders may possibly result, and then troubles begin again. He thought, from a practical working point of view, it was much better to conduct the second test in fourteen days. If an animal had passed two tests, it could be regarded as free from glanders altogether.

Colonel Newsom said that in deciding on fourteen days' interval it was presumed that the animal had become infected before his first test. Thus an animal infected to-day receives the first test in ten days, and does not react. Before the next fourteen days he has probably developed the disease sufficiently to react, though not a clinical case. If a wait of three weeks be allowed, time is afforded for the development of the disease in clinical form.

General Moore said his experience proved that clinical cases of glanders had developed subsequent to the first test, and before the three weeks' interval to the second test had elapsed. It became necessary, therefore, to reduce the period between first and second tests to fourteen days.

Major Drouin believed that it would be wise to fix that period at twenty-one days, or at least twenty days.

With reference to questions (*a*) and (*b*) on General Moore's paper on Glanders, Major Drouin stated that it was well known that no biological test was mathematically accurate, and that a margin of a 5 per cent. of error must be allowed. This degree of error was well outside any ever met with in the practical application of mallein for the detection of glanders.

General Fray remarked that there is no biological agent that may be considered as possessing an absolute value. Mallein is one of the most infallible; but too much should not be expected of it.

In the case of reactions without the subsequent discovery of lesions of glanders on *post-mortem* examination, Major Drouin thought it was probable that this was due to the small and undiscoverable nature of the lesion, or even to a want of thoroughness in detail in conducting the examination. As regards non-reaction to the test in clinical cases, it was generally agreed that the addition of a small quantity of prepared mallein was very unlikely to yield any marked reaction in an animal already overfull of naturally-produced mallein consequent upon the existence of the disease.

General Moore said that it was usual to find when a reaction was reported from a reception veterinary hospital in a horse evacuated from a unit at the Front, that on referring back to that unit other reactors were discovered, not uncommonly in a horse which had been working next to the affected one in the unit.

General Fray added that in formations at rest the destruction of animals, even after two reactions, may very well be deferred when they do not show clinical signs of glanders. In mobile units, however, after two reactions, whether clinical signs appear or not, there should be no delay in destroying the animal. Besides, the use of mallein does not exclude the necessity for clinical examination, because animals affected with acute and very apparent forms of the disease do not react any more, owing to their being surcharged with naturally produced mallein as a result of the disease.

Colonel Newsom asked what the French view was as to the reliability of the mallein test with regard to mules.

General Fray stated in reply that in both the case of the mule and the ass, in which the disease more generally assumed the acute rather than the chronic form, mallein testing was not so reliable. No modification of the preparation of mallein had so far overcome this difficulty. In testing mules and donkeys it was unwise to rely on the temperatures, but to depend on local reaction entirely.

Major Drouin acknowledged that the mallein test was rather delicate to handle with regard to mules. Mules and asses react very irregularly; the disease often develops in the acute form in these animals, and mallein is mostly reactive to latent glanders.

General Fray, continuing, remarked that in his hands the mallein test had never failed. As a matter of precaution, when a horse with no clinical symptoms reacted to the French test, it was submitted to the old test before being finally destroyed.

Major Drouin added that in the French Army two positive reactions were insisted on before destruction was carried out, except when units were on the move or when local conditions made it necessary to destroy after one positive reaction only.

General Moore said that in view of the fact that we were at war it was unwise to take risks, and therefore it was better to destroy positive reactors at once.

II.—NOTES ON EPIZOOTIC LYMPHANGITIS.

BY MAJOR (TEMPORARY COLONEL) W. A. PALLIN, D.S.O., F.R.C.V.S., A.V.C., D.D.V.S., *Third Army, B.E.F.*

Mr. Chairman and Gentlemen,—

I take it as a very great honour that I should have been asked to open the discussion on epizootic lymphangitis; but it has been my lot to come in contact with this disease so often, and in so many different countries, that I have had, I may say, rather exceptional opportunities of studying it, and observing the development and course of the disease in almost every possible phase.

We are, I think, all well acquainted with the causal agent and characteristics of the disease, the classical symptoms of which are: Pustules, granulating sores or buds on the course of the lymphatic vessels, accompanied by corded lymphatics in the vicinity of the lesions, the commonest seats of the same being those regions which are most prone to wounds, such as the cannon bones, knees, the inside of the fore-arm, the hocks, and the inside of the thigh, where the lesions, when present, are, as a rule, exhibited in their most typical form. But in dealing with outbreaks of epizootic lymphangitis it would appear to me that the secret of success is the faculty for suspecting its presence, and diagnosing it at once in all its forms—or, to be more accurate, in all its sites and under all conditions—no matter what other diseases of a similar nature may be prevalent at the same time. I wish to lay particular stress on this point, as some of the lesions which I have, from time to time, seen presented, such as those developing in the submaxillary space after strangles, in the scrotum after castration, on the conjuctiva, on the lips, and also on the nasal mucous membrane, all of which are, to say the least, most confusing, more especially to those who have not had previous experience of this disease. One should have a picture of the characteristic appearance of the epizootic lymphangitis bud, or sore, in one's eye always, so that one may constantly be on one's guard, and at the same time be able to warn others what to look for. And, then, one should be also well acquainted with the microscopical diagnosis, which, of course, is the only certain method of demonstrating the presence or otherwise of the disease; and in this respect we are, needless to say, greatly indebted, not only to Rivolta, the well-known Italian savant, for being the first to discover the cryptococcus, but also to our renowned confrères, the late Professor Nocard and Professor Leclainche, the eminent French veterinarians, for giving us the first clear description of a disease which, for years previously, had almost invariably been confounded with glanders (farcy), ulcerative lymphangitis, and a host of other ulcerating and suppurating diseases.

In dealing with an outbreak of epizootic lymphangitis, undoubtedly the cardinal points are:—

(1) Power of early and accurate clinical diagnosis, and of being able to confirm same by the microscope.

(2) Completeness of the arrangements for isolation, and also for keeping track of the "wound incontacts."

(3) Stringent manner in which the prophylactic measures are carried out.

In examining specimens of pus under the microscope, although a diagnosis may be made with a one-sixth, it is considered that for accurate work a one-twelfth oil immersion is indispensable; also, the necessity for partially shutting off the light is a most important factor in revealing the presence of the organism together with its characteristic refractile double outline.

As we are all well aware, the death-rate from this disease is low; but in view of the long and indefinite period of incubation, the protracted course which cases of this disease take before a cure can be effected, their highly infectious nature, and the fact that some cases which are apparently cured are apt to recur, the first point to be decided is, whether it is advisable from an economical point of view to undertake treatment, or whether wholesale destruction of every case verified should be adopted. If an outbreak can be nipped in the bud—which, with vigorous action, I am confident it can be—then I strongly recommend destruction of every verified case.

When the disease was introduced into England in 1902, and also in Ireland during the following year, I advocated the destruction of every verified case. The Civil and Military authorities in both countries pinned their faith to the procedure recommended, and the disease was completely stamped out in the course of something less than two years, and would no doubt have been eradicated much sooner had it not been allowed to spread to such an extent before it was recognised; but in this matter we were greatly handicapped by having so few veterinary surgeons in Great Britain or Ireland who had ever seen the disease before, or who could make an accurate diagnosis.

During the present campaign, so far as the British Expeditionary Force in France is concerned, our animals have kept marvellously free from the disease; and it was not until September 7th, 1917, that the first case made its appearance. The source of infection in this instance is not known, but the case appears to have been recognised and disposed of at once, as no other cases have developed up to date amongst the incontacts in this particular incident. At other centres, however, we have, perhaps, not been quite so fortunate, and in one cavalry regiment alone thirty-nine cases have occurred as a result of the disease not being detected in time. Still, the total number of cases (viz., seventy-eight) which we have had in the British Expeditionary Force up to date is wonderfully small, and speaks very well for the vigilance of our service, and for the prophylactic measures which we have in vogue, included in which is the policy of immediate destruction of all verified cases, as already indicated.

When treatment is resorted to, such as the complete extirpation of the tissues invaded, it should follow the usual lines for treatment of surgical cases; and, of the many antiseptics tried, it has been found that perchloride of mercury in solution of not less than 1 in 500 has proved the most effective for the treatment of this disease.

Cartier, in *Le Recueil de Médécine Vétérinaire*, recommends the use of potassium iodide in epizootic lymphangitis. He prefers, instead of injecting solutions of the salt into the veins, to give it by the mouth in rather large doses (from 12 to 20 grammes). Usually the treatment is divided into periods of from twelve to fifteen days, with six or seven days' interval between them. The abscesses and nodules are opened and scraped and the wounds washed with solutions of iodine and potassium iodide in order to destroy the parasites *in situ;* and to impede their dissemination, the ulcers are covered with a powder containing one part of mercuric iodide to sixty of talc.—(*La Clinica Veterinaria.*)

I am of opinion that a unit cannot be considered free until six months after the occurrence of the last case. Cured cases should be branded "E. L." and kept in working isolation for not less than twelve months, if possible. "Wound incontacts" should also be kept in working isolation for not less than six months, if possible.

Finally, the free use of the microscope cannot be too forcibly impressed upon those who have to deal with an outbreak of this disease. Much time and unnecessary isolation of animals is saved by an early diagnosis, such as can only be made by the microscope. Material from suspicious wounds should be periodically examined; and even in cases when nothing has been detected at first, further examination may prove the presence of the organisms.

I attach herewith a copy of the form which is used in the British Expeditionary Force in connection with outbreaks of this disease, from which it will be seen that one of the points upon which particular stress is laid is the branding and isolating of the "wound incontacts," as, needless to say, owing to the very indefinite period of incubation, and the insidious manner in which the disease spreads, the rounding-up and earmarking of all animals which have been exposed to wound infection, as well as ordinary contact, are, I consider, the greatest difficulties one has to contend with.

In conclusion, I put forward five points for discussion, viz.:—

(1) What are the minimum and maximum incubative periods of this disease?

(2) In the interests of the State, is it a more economical procedure to destroy all verified cases of the disease than to resort to treatment?

(3) If treatment is resorted to, what is the best and most effective method?

(4) What are the chances of cured cases recurring?

(5) How long will the organism retain its vitality outside the body?

EPIZOOTIC LYMPHANGITIS.

(To be rendered by the D.A.D.V.S. Division, A.D.V.S. Cavalry Division, O.C. Veterinary Hospital, or C.H.D. or S.V.O. Remount Depot, through usual channels to H.Q., Veterinary Directorate.)

1. Unit.
2. Description of Animal.
3. History:—
    - (*a*) Date of discovery.
    - (*b*) Probable date clinically affected.
    - (*c*) Nature of lesion and seat.
    - (*d*) If confirmed by microscope.
    - (*e*) Date destroyed.
    - (*f*) Date joined Unit and where from.
    - (*g*) Where located during past three months, and period of time in each case.
    - (*h*) If suffered from a wound or Ulcerative Cellulitis during that time and date.
    - (*i*) Opinion as to most likely source of infection.
4. Number of wound incontacts since date shown at (*b*) and disposal of each.
5. Description and position of stables or standings where case occurred.
6. Action taken in respect to outbreak.
7. Remarks by A.D.V.S. Corps.
8. Remarks by D.D.V.S. Army, Cavalry Corps, or Area.

INSTRUCTIONS REGARDING AN OUTBREAK OF EPIZOOTIC LYMPHANGITIS: FOR GENERAL GUIDANCE.

1. Isolate case immediately.
2. Report to Administrative Veterinary Officer by wire or telephone.
3. Confirm diagnosis by microscope.
4. Destroy animal and bury carcase deeply, unskinned.
5. Enquire into history of animal, and its movements for past three months.
6. Take evidence with regard to any previous wound or Ulcerative Cellulitis.
7. Vacate standings and thoroughly disinfect ground.
8. Disinfect harness and equipment of Unit.
9. Burn clothing, grooming kit and line gear of affected animal and animals on either side, also stable litter.
10. Burn all soiled dressings used in treatment of wounds.
11. Stop all hand dressing of wounds.
12. Restrict use of cotton wool and tow.
13. Ensure dressing of wounds under strict veterinary supervision.
14. Exercise care with regard to veterinary instruments, particularly knives, probes, forceps, scissors. Boil after use.
15. Reduce number of kicks, galls, and other surface injuries so far as possible.
16. Examine carefully all animals of Unit for wounds.
17. Stencil letters " E.C. " (meaning Epizootic Lymphangitis—incontact) on off thigh of all animals of the Unit found with wounds, however slight, at the time of inspection, or from probable date clinically affected.
18. All wounds, however slight, to be reported and a record kept.
19. Unit in which case occurred to be placed in working isolation with special attention to wound incontacts.
20. All " E.C." animals to be treated in isolation when admitted to veterinary hospital.
21. Carefully study pamphlet on Epizootic Lymphangitis by Colonel W. A. Pallin, D.S.O., A.V.C., issued to all V.O.'s of B.E.F.

DISCUSSION.

General Fray said that the British Army had been much more fortunate than the French, who had encountered many cases. In every 100 horses suffering from lymphangitis, an average of ten were affected with epizootic lymphangitis, fifteen with ulcerative lymphangitis (ulcerative cellulitis), while in the remainder were found the most varied bacteriological species, so that they had a number of forms of lymphangitis. No specific treatment suitable for all these forms had been discovered. He believed, however, that wholesale destruction should not be practised.

The occurrence of cases of epizootic lymphangitis remains very much the same from one end of the year to the other. Mud seemed to be a medium for transmission of the disease, but flies did not appear to play an active part in spreading infection. Only animals with a commercial value were treated. Those which were not susceptible of cure within three months were sent to the butcher's, the meat only being used after excision of the affected parts.

The French opinion, voiced by Major Drouin, as to the period of incubation was that it was never less than three months in the naturally acquired disease.

General Moore expressed the opinion that it varied from three weeks to three months.

Colonel Hunt considered two and a half months was most probable.

Colonel Pallin quoted the fact that Professor Mettam (Dublin) had experimentally produced a nodule of the disease in forty days, which had developed into a pustule in forty-five days.

General Moore explained that it was necessary, not only to prevent serious invasion amongst the animals of the Force, but to guard against its admission into England at the conclusion of the war, and for this reason the policy of immediate destruction was adopted in the British Expeditionary Force.

Major Nicolas stated that at the Front in the French Army at least half the cases which came to light were cured in from one month to six weeks. In cases where cure was not apparent or infection was serious the animals were destroyed.

The treatment adopted was that of excision of the lesions and corded lymphatics, followed by cauterisation. Pyo-vaccination was practised in conjunction with this.

With regard to question 4 in the paper, General Fray said he had met with cases of recurrence of the disease in cured animals in Algeria.

Major Nicolas, on the other hand, stated that such recurrence had not been met with in his experience in France.

General Fray added that the French had methods which were very good; one of these—viz., auto-pyotherapy, favoured by Major Drouin, and adopted in Morocco, yielded good results in epizootic lymphangitis.

Large doses of mallein have been recommended as regards ulcerative cellulitis.

They could, and must, treat epizootic lymphangitis in the French Army. He believed it to be curable, and said that it was much less dangerous than ulcerative lymphangitis (ulcerative cellulitis), which they had not been able to subdue yet.

III.—ULCERATIVE CELLULITIS OR ULCERATIVE LYMPHANGITIS.

By Colonel A. C. Newsom, C.M.G., D.D.V.S. (Southern).

This disease being non-existent in England, Canada, and America, was, prior to the war, little known to English veterinary surgeons.

History.—Towards the end of July, 1916, it first began to make its presence felt in the English Army in France, and since then it has been making steady progress, till at the present time the numbers under treatment are considerable, and the average weekly admissions from the Field show a tendency to increase.

From the time its presence was recognised it was realised as likely to prove a menace to efficiency. Early evacuation of infected cases and their concentration in special centres for treatment was ordered. A special officer (Captain E. A. Watson, of the Canadian Army Veterinary Corps) was told off to work on the bacteriological side of the disease with a view to preparation of some means of vaccine-therapy, as it was realised that it was only on these lines success in combating the trouble was likely to be met.

The following vaccines have been produced and given trial:—

(1) From pure culture of Preiz-Nocard bacillus, prepared by the alcohol-ether method.

(2) A polyvalent mixed vaccine containing Preiz-Nocard bacilli and such other organisms as are generally met with, consequent upon accidental infection, in ordinary lesions of the disease.

(3) A pyo-vaccine made by treating the pus from a case of generalised infection (generally from a kidney abscess).

(4) A hyper-immunised serum, from an animal which has been subjected to the ordinary process of hyper-immunisation.

Results of Treatment.—Speaking generally, it may be said that it is only in the cases of early injection that satisfactory results in treatment of any kind can be anticipated. Where evidence of long-standing or severe infection exists, the most economic procedure is to destroy, and this is the policy which has been adopted. All animals showing multiple lesions of more than average severity, or in which more than one limb is involved, or which exhibit lesions above the knee or hock, as the case may be, or which, from their general condition, suggest the existence of internal (kidney) abscess formation, and finally all known cases of relapse, are destroyed.

Treatment by the various vaccines as above summarised have given sufficiently satisfactory results to justify the hope that real good may follow a continuance of effort.

Pyo-vaccination, as far as can be judged, shows the best results, and all who are employing this means speak well of it.

The laboratory work which has been carried out with hyper-immunised serum gives promise of possible advantage to come from its employment, in so far that it has been found to exercise a distinct antibactericidal influence. A trace of the serum in an otherwise suitable medium entirely prevents growth.

Experiments are being tried with this agent alone as a hypodermic or intra-venous injection, and also as a local dressing for wounds, and others in combination with ordinary and pyo-vaccines; but in relation to these it is too early to give any opinion as to their practical value.

General Treatment.—It has been found that cure of lesions may be brought about by the use of ordinary antiseptic dressings; and such special agents as picric acid, methylene blue, scarlet red, as well as the intra-muscular injection of iodine and various mercurial preparations, have resulted in what would, at first sight, appear to be cure, but, in the main, cases so treated have exhibited a tendency to recur.

Source of Infection and Method of Spread.—The number of cases which become infected after admission to hospital is, comparatively speaking, small. The majority of the cases come from the Field, and there can be little doubt that the chief causes are infected mud and contaminated billets.

Infection from animal to animal is not as important a factor as in the other forms of specific lymphangitis.

While present conditions obtain, it is not very evident that preventive action is possible, other than the very important one of ensuring the thorough disinfection of railway trucks.

In the present knowledge of the disease, it is not clear that one attack affords immunity, and if this be so, there is no prospect of a preventive vaccination being found.

DISCUSSION.

Colonel Newsom went on to say that during the winter of 1915-16 a very large number of cases affected with skin lesions of one kind or another were met with. Amongst these were the so-called "frost-bites" (a condition really due to the action of the bacillus necrosis) and other affections of the skin of the lower part of the limbs. As the year advanced it became apparent that there were amongst these a number affected with a specific disease characterised by general cellulitis of the limb or limbs affected, and associated with the development of ulcers which did not appear to be directly connected with one another. To those the name "ulcerative cellulitis" was given; and though later in the year 1916 it was discovered that these were due to the presence of the bacillus of Preisz-Nocard, this name was adhered to in order to avoid confusion.

Treatment.—Every known form of treatment was applied, and it was found quite easy to cure any given lesions; but these invariably tended to recur, and it was only by the use of vaccines that any real cure could be said to result.

It was noticed that, where the sea was available, a combination of sea baths with the employment of vaccines gave very satisfactory results.

General Moore stated that there had been a very large number of cases of cellulitis, and those which were not considered worthy of treatment were sent to the butcher.

Captain Watson had at the present time 1,400 cases under his care. A summary of a report on these by the officer working under Captain Watson's direction was read by Captain Davis.

NOTES ON TREATMENT OF ULCERATIVE CELLULITIS AT DETACHMENTS OF No. 24 VETERINARY HOSPITAL, FROM NOVEMBER 19TH, 1917, TO JANUARY 11TH, 1918.

Summary of Total Cases admitted to Hospital.

Cured.	Sent to Butcher.	Died.	Cast.	Remaining.	Total.
595	229	2 (one of these arrived dead in train.)	2	572	1,400

Cured animals are sent to No. 24 Veterinary Hospital, Gournay-en-Bray. A certain percentage have in addition to ulcerative cellulitis other diseases, such as mange, ophthalmia, etc. These secondary diseases are treated at this hospital, but when the cellulitis is cured they are then transferred to No. 24 Veterinary Hospital, irrespective of the condition of the other diseases with which they are affected.

Altogether 634 animals have been discharged from this hospital to No. 24 as cured; but thirty-nine cases have been returned here, having had a recurrence of the cellulitis.

Animals previous to December 20th, 1917, had been treated with Preisz-Nocard vaccine, or treatment other than by injections. The summary of cases treated up to that date is as follows:—

Up to and including December 20th, 1917.

Cured.	Sent to Butcher	Died.	Cast.	Remaining.	Total.
383	24	*Nil.*	2	703	1,112

On December 18th, 1917, Captain Watson, C.A.V.C., paid a visit to this hospital, bringing with him, in addition to Preisz-Nocard vaccine, a supply of prepared pus and serum. He requested that these should be tested against each other. Sixty animals were, therefore, selected and divided into three twenties, each twenty containing a similar number of mild, medium, and advanced cases. In the case of the animals treated with serum it was intended, after seven days' injection, to sub-divide this group of twenty into two of ten, continuing the daily injection of serum with the one group, and in the case of the other proceeding to vaccine treatment with Preisz-Nocard vaccine. It was, however, found that at the end of seven days the supply of serum was exhausted, so the whole twenty were, therefore, treated with Preisz-Nocard vaccines.

Group No. 1. Serum.	Group No. 2. Pus.	Group No. 3, P.-N. Vaccine.
Cured 9	Cured 12	Cured .. 8
Doing well; no discharge from ulcers, but requiring a few days for superficial wounds to heal 5	Doing well, but requiring a few days for wounds to heal.. 2	Doing well but requiring further time 9
Requiring further treatment 3	Requiring further treatment 2	Doubtful case—possibly a butcher .. 1
Doubtful cases—possibly butchers .. 3	Butcher cases .. 4	Butchers .. 2

Group No. 1.—Treatment consisted of injecting 15 c.c. of serum daily for seven days, and then proceeding with Preisz-Nocard vaccine, commencing with 2 c.c. and increasing the dose by 1 c.c. each week. Local treatment consisted of well washing with saline solution. Exercise was given whenever possible; but the roads having been so slippery lately, exercise had, unfortunately, to be abandoned on several days. Remarks as to local treatment and exercise apply to all three groups.

Group No. 2.—In this case treatment commenced with 2 c.c. of prepared pus injected hypodermically in the neck—near side one week, off-side the next. Each week an injection was given, increasing the dose by 1 c.c. each time.

Group No. 3.—In this case treatment was commenced by giving 1 c.c. or 2 c.c. Preisz-Nocard vaccine hypodermically, and increasing the dose by ½ c.c. or 1 c.c. as thought necessary. One injection was given each week. Polyvalent vaccine was given when thought necessary in doses of 2 or more c.c.

It is certainly not fair to deduce final conclusions at the present stage of these tests, but the following may be submitted as tentative conclusions based on the progress made up to the present :—

(*a*) No form of treatment in advanced cases seems to be of any avail.

(*b*) From the above it follows that cases of ulcerative cellulitis should be submitted to treatment by anti-bodies in the initial stages of the disease.

(*c*) From the results of the comparative treatments, up to the present, that of prepared pus vaccine seems to be the most effective, as progress is more rapid and less thickening is left.

(*d*) The results of the other two groups were about equal, and no very definite conclusion as to their relative merits can be submitted as a result of this experiment. Certain it is, however, that in this particular instance progress was more slow than in the case of the group treated by prepared pus.

Summary of Cases sent to Butcher.

Number of cases sent without any treatment at all a few days after being admitted to hospital	105
Number of cases sent after treatment by other means than vaccine	16
Number of cases sent after treatment by Preisz-Nocard vaccine	87
Number of cases sent after treatment by prepared pus ..	21
	229

Many of the cases sent to the butcher after treatment by vaccine were sent a few days after arrival at this hospital, having been treated by the vaccine before arriving here.

It is, therefore, submitted that a more uniform standard of condemnation should be aimed at.

(Signed) H. J. HINES, Captain A.V.C.

General Fray stated that ulcerative lymphangitis (cellulitis) cases were treated with attenuated pure cultures of Preisz-Nocard bacilli. The percentage of cures of horses affected with this disease was 15 per cent. This was confirmed by the bacteriological observations, by which means, also, the percentage of cases of ulcerative cellulitis was approximately fixed.

Before closing the discussion on this subject it was agreed between General Fray and General Moore that the officers working in the laboratories of the French and British Veterinary Services should keep in constant touch, and acquaint each other with the results of their researches into animal diseases.

Captain Watson stated that it was possible to immunise animals against the Preisz-Nocard bacillus to such an extent as to enable them to resist enormous doses of living cultures.

Major Drouin agreed with this, but pointed out that in his experience this was only possible when dealing with the pure Preisz-Nocard bacillus culture, and that this constituted the difficulty in coping with the disease, as the majority of the cases met with were complicated by the presence of other organisms.

Captain Watson replied that this was his experience also, and that he had found, where simple Preisz-Nocard infection existed, cure in a very short time had been comparatively easy, and that in such cured cases observation extending over six months or longer failed to show any signs of recurrence of the disease.

General Moore stated that the policy of early evacuation was adopted with the object of enabling treatment to be undertaken before serious contamination had been brought about, or before invasion had become so well established as to seriously lessen the chance of recovery.

General Fray said that in the French Army it was considered that the disease was imported from America, as, though it had been met with in France before the war, it had never been encountered in anything like the numbers which have developed since the war broke out

General Moore pointed out that the existence of the disease was denied both in America and England; and went on to say that, having in view the enormous amount of contamination of the soil which had taken place as the result of the concentration of so many animals in such a comparatively small area, it was not to be wondered at that specific diseases should be extensively met with throughout the Force. He stated, in explanation of this, that 5,000,000 tons of dung and 3,000,000 gallons of urine had been excreted by the animals of the British Force alone since the beginning of the war.

(*To be continued in next issue.*)

CARREL'S TUBE TREATMENT FOR SEPTIC WOUNDS AS ADAPTED TO VETERINARY SURGERY.

By Captain E. S. W. PEATT,
Army Veterinary Corps.

THE treatment consists of a constant or intermittent instillation into wounds of a chosen antiseptic solution, conveyed to all parts of the wound by means of rubber tubes. Few, if any, of the wounds seen in horses, excepting some operation wounds, are sterile; but in spite of this all simple wounds heal rapidly with ordinary treatment. The cases noted here, however, have all been bad cases in which there was a doubt of recovery—e.g., fistulous withers, quittors, incomplete splintered fractures with sinuses discharging quantities of pus, old sinuses and abscesses, open joints, and tendon sheaths. This treatment which I have adapted is a modification of "Carrel's tube treatment," now in universal use for septic wounds in the human subject.

APPARATUS REQUIRED.

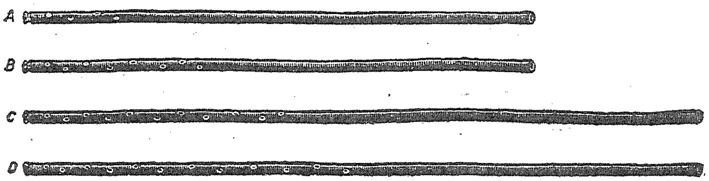
(1) A reservoir in the form of a small tank with a pipe leading from the bottom; the tanks are used in different sizes according to type of wound; the capacity varies from 4 to 10 pints—one to hold 6 pints is a useful size; the reservoir is fixed above the animal to the roof or wall at a slightly higher altitude than the wound.

A syringe is employed where a reservoir cannot be used.

(2) Rubber tubing of two kinds—(*a*) conducting tubes, and (*b*) instillation tubes.

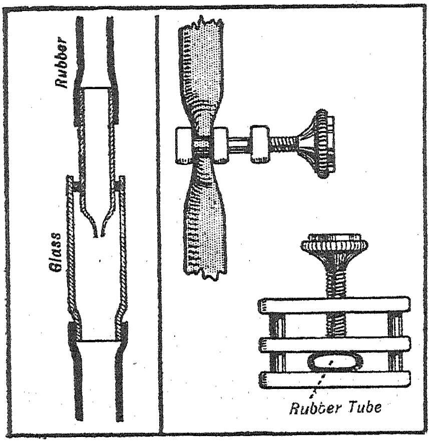
(*a*) The conducting tube has the larger lumen, about ¼ in.; it leads from the pipe on the bottom of the reservoir to the wound, therefore varies a lot in length—4 to 6 ft. is the usual length. This tube has a stop-cock on it which regulates the flow of fluid. At the wound it is divided into the required number of instillation tubes, one to eight, by means of a glass distributing tube; or if only one tube is needed, and the wound is large, the conducting tube may go direct to wound.

(*b*) These instillation tubes go direct to the various parts of the wound where they are needed. They are small tubes from 9 ins. to 2 ft. long, with a lumen varying from 1-16th to ¼ inch, and may, or may not, be perforated laterally with small openings; if these openings are present, the end of the tube is generally ligatured. If a reservoir cannot be used, then the fluid is instilled into the wound every two hours by a syringe, whose nozzle is placed direct into the instillation tubes, no conducting tube being necessary.

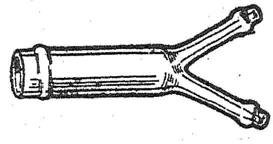


Conducting or "instillation" tubes, rubber, with multiple holes, closed at one end.

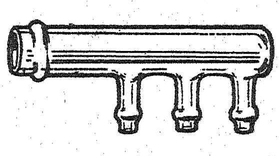
(A) Tube 30 cm. long, pierced over a length of 5 cm.
(B) Tube 30 cm. long, pierced over a length of 10 cm.
(C) Tube 40 cm. long, pierced for a length of 15 cm.
(D) Tube 40 cm. long, pierced for a length of 20 cm.
(10 *cm. = about* 4 *inches*).



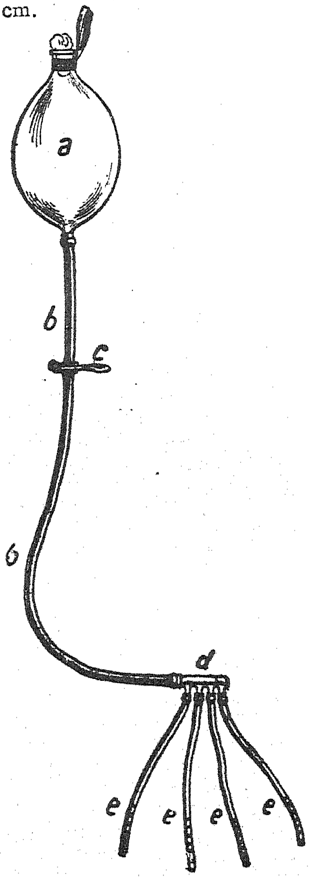
"Drop-counter," Gentile's. Screw pinch-cock (*Pince de Mohr à vis*).



Glass distributing tube with two branches (*verre de Gentile*).



Glass distributing tube with three branches (*verre de Gentile*).



Apparatus for intermittent instillation: *a*, Reservoir (*ampoule or flask holding a litre*); *b*, Irrigating tube with a diameter of 7 mm.; *c*, Pinch-cock (*Pince de Mohr*); *d*, Distributing tube with 4 branches; *e*, Conducting tubes.

The illustrations above are taken from Carrel and Dehelly's Treatment of Infected Wounds.—(Bailliere, Tindall & Cox.)

In this method, after injecting the fluid, the free end of the instillation tube must be closed by placing a piece of gauze over the lumen and putting a clip on it—e.g., a bull-dog artery forceps—to keep out dust and dirt, etc. If a reservoir is being used, the animal must be tied up short and have a heel shackle on so that he cannot lie down or move about enough to disturb the tubes in the wound. If rugs are being used, the tube can be prevented from pulling out of the wound by tying it to the rug with tapes. In leg cases the conducting tube is kept in position by pieces of bandage, tying it to leg at intervals. A pair of long-handled bullet forceps are often useful to conduct tubes to the bottom of a deep wound.

ANTISEPTIC FLUIDS USED.

Two were tried: (1) Eusol solution; (2) Dakin's solution.

(1) To prepare Eusol use the following preparations:—

℞ 25 drachms of B.P. Liquor Cal. Chlorinat, dilute with
1 pint water.
Boric acid, 1¾ drachms.

Add the lime to the water first, shake and put in the boric acid, shake again and allow to stand overnight. Filter off, and the clear fluid is ready for use. This solution is made fresh every night, is kept in the dark, and allowed to stand twelve hours before use.

(2) To prepare 10 litres of Dakin's solution:—

℞ Chloride of lime (having 25 per cent. active chlorine)	184 grammes.
Carbonate of soda, anhydrous	92 ,,
or	
Carbonate of soda, crystals	262 ,,
Bicarbonate of soda	76 ,,

Place the chloride of lime and 5 litres of water in a 12-litre flask, shake, and leave all night. Dissolve the carbonate and bicarbonate of soda in 5 litres of cold water. Mix the soda solution and the chloride of lime solution, shake, and allow to settle for half an hour. Then syphon off the clear liquid and filter till clear, and keep away from light and in a cool place.

PREPARATION OF WOUND.

This treatment must not be used on operation wounds until hemorrhage has ceased, because the blood clogs up the tubes, and also it is impossible to plug the wound tight enough to stop bleeding if tubes are in it. To allow penetration of the antiseptic fluid, all dead tissue and foreign bodies are removed, and anything that is likely to harbour organisms and so tend to keep the wound septic. In human surgery a dependent opening for drainage is said to be unnecessary if Carrel's treatment is employed, but most of the cases noted here had good drainage ; two cases at present, however, are being treated without a dependent orifice and are doing well.

METHOD OF DRESSING.

It is essential that the fluid come in contact with the tissues in all parts of the wound, especially the deeper sinuses and loculi,

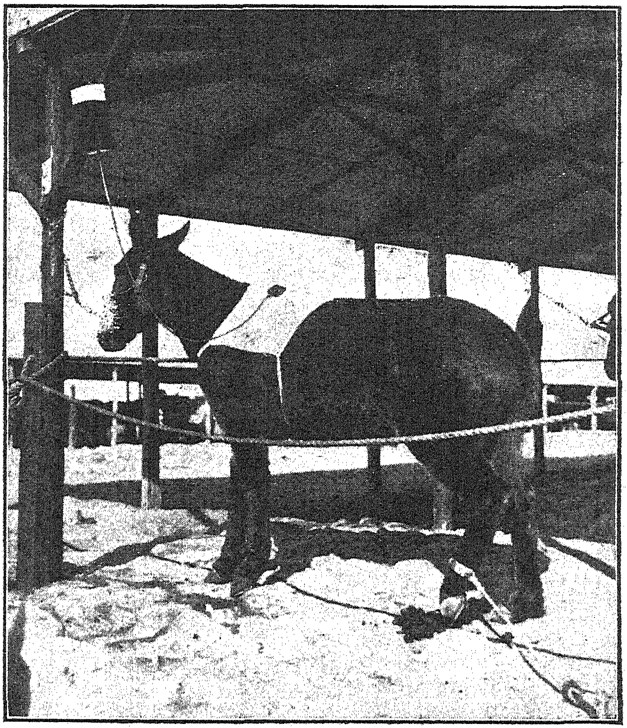


FIG. 1.

therefore wounds must be carefully examined by probing and manipulation, etc., till a thorough knowledge of all the peculiarities of the wound is obtained—e.g. its tracts, diseased portions, and deeper loculi. One must make use of this knowledge when dressing the wound, and pass tubes to the parts which are known to be the seat of infection.

How to Dress Three Common Varieties of Wounds.

(1) Punctured or cup-shaped wound with no dependent opening. Introduce a plain tube to the bottom of the wound, which is then kept filled up with the fluid. The tube is securely fixed in wound :—

(*a*) If the mouth of the wound is small, by wrapping a strip of gauze round the tube and plugging it into wound like a cork into a bottle.

(*b*) If it is a large wound and (*a*) is impossible, a stitch in the skin tied round the tube will hold it in. This method was used in a large number of cases.

(*c*) If the wound is on a limb, the tube can be bandaged in.

(*d*) If the wound is on the body where a bandage cannot be used, but where a piece of linen or calico can be fixed on by means of tapes—e.g. over the withers—by fixing four tapes one to each corner, tying the front two in front of the neck and the other two below the chest. (See photograph.) On head, by making a bandage head collar and fixing numnah on it. (See photograph.) Then the tube can be fixed by stitching small, square pieces of numnah on the linen or calico at the point where the tube is to enter; a small hole is made through both numnah and calico, being a tight fit for the tube; the numnah then grips the tube, when it is pulled through this hole and holds it firmly.

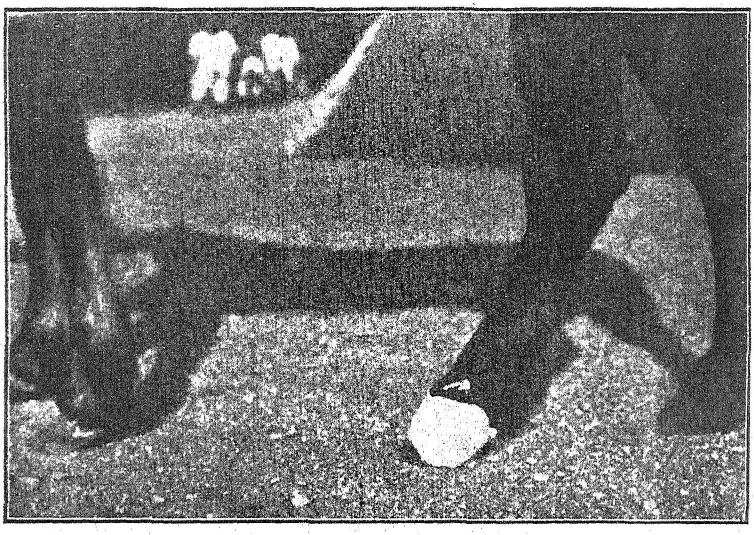


FIG. 2.

(*e*) If the wound is a superior one and the tube will stay in it easily, then only a square piece of cotton wool with a hole for tube to protrude through is needed. The wool is stuck on over wound by means of gum smeared on the skin an inch from the edge of the wound all round it. In winding tortuous wounds, pieces of gauze must be used in the wound to pack the tubes in position. An objection to sticking a piece of wool over a wound with gum is that the continuous trickle of fluid soaks the wool and it drops off; therefore it is a good idea not to stick the wool to the skin immediately below the most dependent part of the wound, so that fluid does not tend to wash it off.

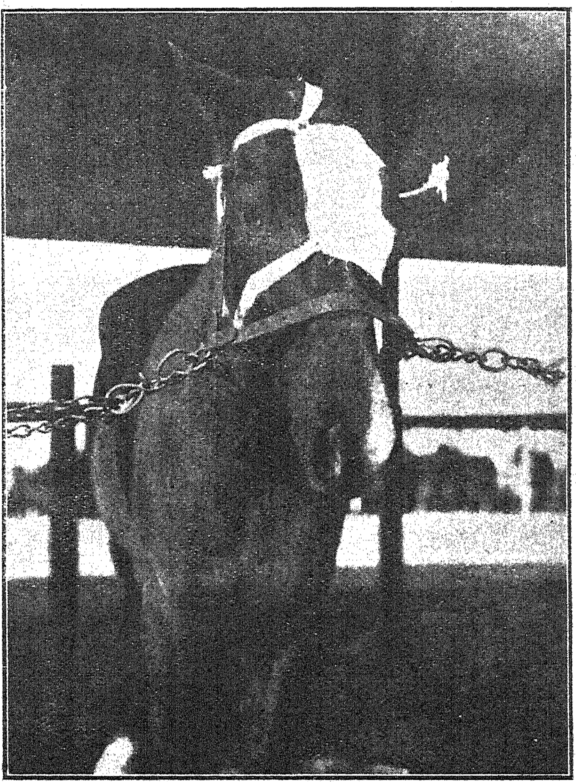


FIG. 3.

(2) In a surface wound an instillation tube with lateral openings and its end ligatured is laid on the surface to be treated, and kept in position by one of the methods mentioned above.

(3) Fistulæ or Seton type of wound having two openings.—Place a laterally perforated tube in at upper opening and plug the dependent one so that the fluid soaks gradually through, otherwise it escapes too

quickly, especially if the wound is vertical. In the latter variety of wound—i.e. vertical, only place a short length of tube into the wound so that the fluid flows over the whole surface of the wound before escaping. Use as few gauze and cotton-wool pledgets as possible in a wound to keep tubes in position, as they soak up pus and harbour organisms. The skin round the wound is cleansed by treating it with oil and petrol dressing.

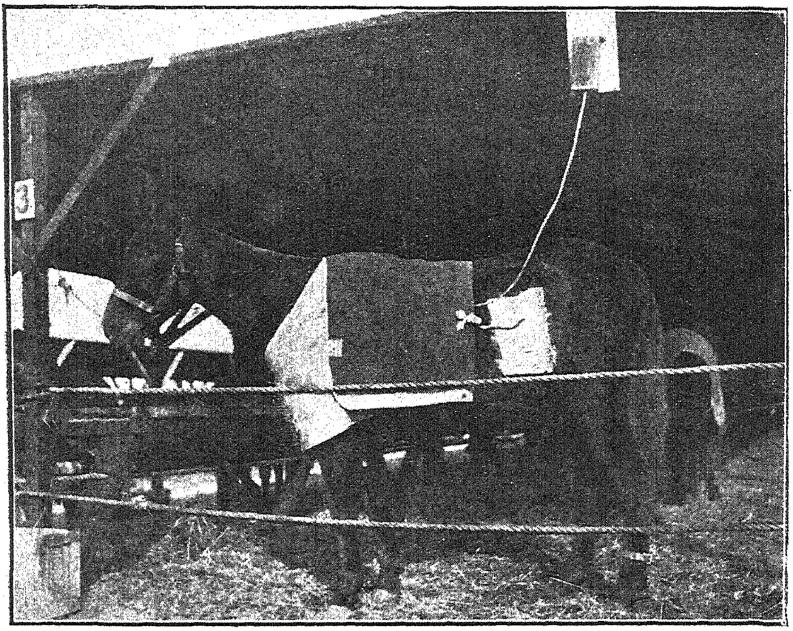


FIG. 4.—Large Sinus Flank. (Not in Summary of Results.)

APPLICATION OF ANTISEPTIC.

The instillation tubes being placed in position in the wound and the dressing being completed, the instillation tubes are connected up to the reservoir by means of the conducting tube, and glass distributing tube if necessary. When a glass distributing tube is used it must be fastened to the dressing by a safety-pin or tape.

The stop-cock is turned on sufficiently every two hours to allow the fluid to trickle slowly into the wound, the quantity varying with the wound from 5 ozs. to 2 pints. This is the procedure day and night, the wound being dressed every twenty-four hours by being flushed out with Eusol, the skin round it being cleansed with oil and petrol dressing and sterile tubes put in. The used tubes are thoroughly

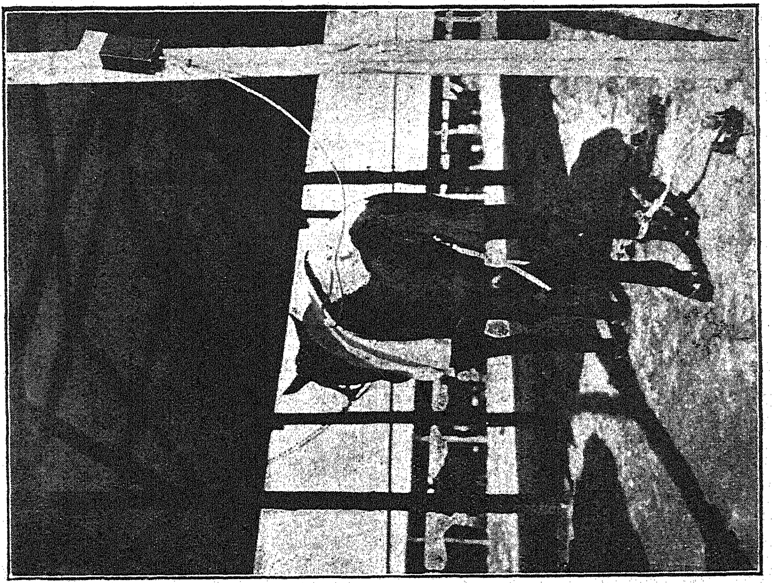


FIG. 5.

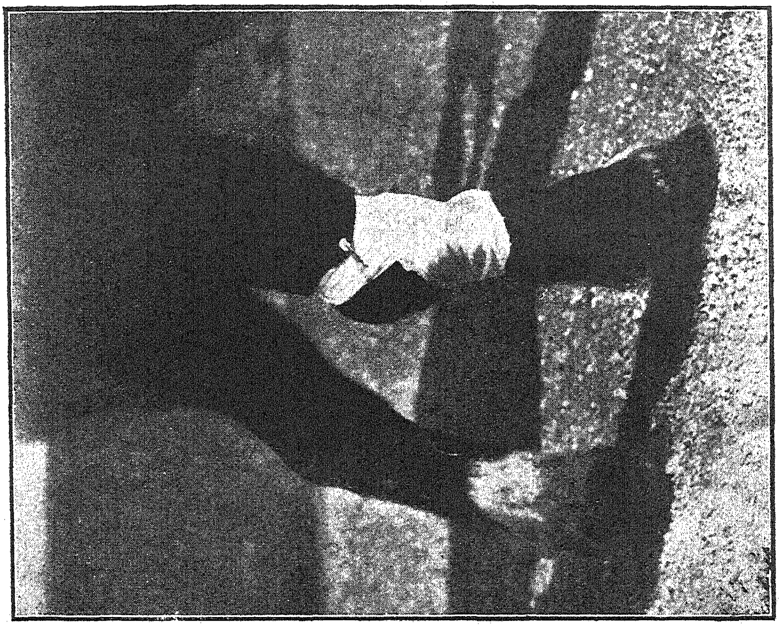


FIG. 6.

washed out and placed for twelve hours in 5 per cent. carbolic acid lotion before being used again.

In human surgery a daily microscopic examination is made of each wound by taking smears, and when organisms disappear and the wound becomes sterile it is sutured, and heals as if by first intention. This is not practicable in veterinary surgery, as the wound is never kept absolutely sterile, and by experience we have found that most wounds in horses and mules heal as quickly without suturing, with less likelihood of complications, and leave if anything a smaller cicatrix.

Most of the cases noted here were treated with Eusol, the remainder with Dakin's solution; no appreciable difference in the results given by the two liquids was noted.

SOME POINTS IN FAVOUR OF THIS TREATMENT.

(1) Wounds can be treated practically continuously with an antiseptic without the work entailed by removal of the dressing.

(2) The antiseptic penetrates to the most remote parts of the wound to those areas where it is most needed.

(3) The continuous application of the treatment both by its antiseptic and mechanical actions must be an improvement on the older method, where, even if the antiseptic was as good, it was probably only used once every twenty-four hours, and then did not penetrate to the deepest part of the wound.

(4) The tissues are conserved owing to such large operation wounds being unnecessary and granulations are not so profuse.

(5) The fluid has the valuable property of assisting a rapid dissolution of necrosed tissue.

(6) Pain after operation seems to subside more quickly than when other treatments are used, and in the case of an animal with a temperature, and other symptoms of toxæmia or general infection, the temperature drops and the other symptoms disappear after the treatment has progressed for a short time—e.g. 24 to 36 hours.

(7) The fluid used is economical.

(8) The results are excellent.

RESULTS OF CASES TREATED.

No. of Case.	Animal.	Condition.	Operation.	Treatment.	Results.
2	BayMare L.D. ..	Quittor near Hind.	Operated 14–11–17 by window method, rasping down horn of quarter and making two openings, one above and one below coronary band, leaving the band intact. Removed all remaining cartilage, portions of it green. This animal had been operated on before several times.	Packed with dry dressing and gauze. Next day put in two tubes above band, keeping them in by wrapping sufficient gauze round them to plug the opening; also plugged wound below band to prevent the too rapid escape of the fluid. The tubes were then bandaged securely to pastern (see photo). Eusol solution was syringed into tubes every two hours. The sensitive laminæ laid bare by removal of horn were smeared with Archangel tar and a very tight bandage applied to keep down granulations; the latter were removed by knife about once a fortnight. All the quittor cases were treated by this method. (See photo. No. II).	Wound completely healed 20–12–17. Discharged into Kraals 10–1–18.
3	Dark Bay MareL.D.	Quittor N.H. ..	Operated 15–11–17 ..	Similar to No. 2; was a bad case; wound is healed but horn not grown over yet.	Still under treatment.
7	Chestnut Geld. H.D.	,, O.H. ..	Operated 26–11–17 ..	As usual, had been operated on and treated before.	Healed and discharged into Kraals 27–12–17.
8	Chestnut Mare	,, N.H. ..	Operated 26–11–17 ..	Do. Do. ..	Discharged into Kraals 20–12–17.
9	Brown Mule Gelding.	,, O.H.	Operated 29–11–17 ..	Do. Do. ..	Completely healed. Discharged into Kraals 7–1–18.
15	Bay Mare H.D.	,, O.H. ..	Operated 18–12–17 ..	Do. Do. ..	Wound healed, tube removed 30–1–18.

RESULTS OF CASES TREATED.—*Continued.*

No. of Case.	Animal.	Condition.	Operation.	Treatment.	Results.
24	Bay Mare L.D.	Quittor N.H. ..	Operated 10-12-17 ..	As usual, had been operated on and treated before.	Was destroyed for old age and quittor.
32	Dark Grey Mule.	N.H. ..	Operated 12-12-17 and removed a lot of necrosed cartilage.	Do. Do. ..	Completely healed. 12-1-18.
4	Dark Brown Geld. Mule.	Fistulous withers and vertebræ diseased.	Made two vertical incisions on each side, removed tops of diseased vertebræ and all necrotic tissue, curetted stumps of vertebræ. Operated twice, on 12-11-17 and 16-1-18, removed tops of vertebræ.	Plugged with dry dressing after opening. Put in tubes next day supplied from reservoir. To keep tubes firmly held in wound pieces of numnah were sewn on a square piece of calico over place where tubes were to enter; holes were then made through both numnah and calico a fairly tight fit for tubes. The calico, was strapped on wither by tapes under forearms. (See photo No. I).	Healed and discharged into Kraals 1-2-18.
14	Black Mare Mule.	Fistulous withers.	Operated 19-12-17, only making a small wound; removed pieces of diseased spine, curetted same, and removed some necrotic tissue.	Treated similar to No. 4. This animal was operated on before several times and treated in different ways.	This case has done very well up to date. Wound healed, discharge ceased, but skin not grown over.
29	Bay Gelding	Fistulous wither..	Operated 10-1-18 curetted; vertebral spines and removed necrotic tissue.	Similar to No. 4	Still under treatment and doing well.
6	Brown Mare Mule.	Incomplete splintered fracture of external angle of ilium.	Operated 24-11-17; removed broken pieces of bone, curetted main bone.	Put in one tube, securing it with a stitch through skin at upper edge of wound and dressed by sticking a square piece of wool over wound with gum.	Healed and discharged into Kraals 15-12-17.
16	Brown Mule	Sinus buttock ..	——	——	Died suddenly.

17	Brown Mare Mule.	Splintered fracture of tuberischium.	Operated twice, 21–12–17 and 8–1–18; removed broken pieces of bone, and curetted.	Was a bad case, large quantities of laudable pus oozing from wound. Put in two tubes and used irrigator.	Healed excepting wound in skin, 30–1–18.
18	Chestnut Gelding, Mule	Similar to No. 17, but worse.	Operated 21–12–17; made dependent opening.	This was a worse case than No. 17, and was not expected to recover; it ceased discharging in 4-6 days, and healed in a remarkable manner.	Healed excepting skin wound, 27–1–18.
23	Br. Gelding, Mule.	Splintered fracture of radius.	Operated 24–12–17; opened up sinus, removed bone, and curetted.	Kept tube in with bandage	Healed and discharged into Kraals 8–1–18.
26	Dun Gelding, Mule.	Fractures of spines of sacrum.	Operated 8–1–18; removed tops of spines, curetted and removed some necrotic tissue.	Laid tube with side openings along wound and covered with cotton wool stuck with gum. (See photo No. 5).	Discharge ceased in 5 days; granulations have grown over spines; only skin wound left.
27	Dark Brown Gelding, Mule.	Similar to 26; not so bad.	Operated 8-1-18	Similar to No. 27	Healed 28–1–18.
1	Dark Brown Gelding.	Picked up nail, piercing lateral lacuna of frog, and going forward and up to coronet, which was under-run.	Operated 3–11–17; got drainage from coronet along course of nail by cutting out sinus made by nail. Made a superior opening above coronary band where abscess under band had pointed.	The day after operation one tube was fixed in wound above band by means of a gauze plug; only a short piece of tube protruding into wound so that fluid came into contact with whole wound. The wound in frog was plugged with gauze and kept in position with tow and plates. Tube was bandaged in and fluid injected by syringe every two hours. Horse was very lame, could bear no weight on foot.	Discharge ceased in 3 days; wound healed very rapidly, and on 21–11–17 wound was completely healed and horse trotting sound. This was a marvellously rapid recovery.
10	Brown Mule, Gelding.	Old suppurating sinus on outside of hock.	Operated 2–12–17; opened up; there was a lot of pus.	Bandaged in tube and treated as usual. (See photo No. 6.)	Wound completely healed and mule discharged into Kraals 10–12–17.

RESULTS OF CASES TREATED.—*Continued.*

No. of Case.	Animal.	Condition.	Operation.	Treatment.	Results.
12	Bay Mare, Rider.	Punctured wound outside hock, lot of discharge.	Did not operate	Put in a single tube to bottom of sinus. 12–12–17.	Wound healed and mule discharged into Kraals, 24–12–17.
19	Bay Gelding	Old septic abscess in muscles of second thigh.	Operated 22–12–17; opened up.	Put in one tube	Wound healed 8–1–18 and discharged to Kraals.
20	Brown Mare, Mule.	Punctured wound elbow joint; the latter under-run with pus.	Operated 22–12–17	Put in one tube	Wound healed 9–1–18, and discharged into Kraals.
21	Br. Gelding, Mule.	Sinus of dorsal veterbræ similar to fistulous wither.	Operated 24–12–17; removed necrotic tissue and curetted. Been operated on before several times; a very old case.	Laid tube with lateral openings along wound and placed a piece of cotton wool on top.	Healed and in Kraals 9–1–18. Very good case.
22	Brown Mule	Sinus buttock	Operated 24–12–17	Put in two tubes	Still under treatment.
30	Br. Gelding, Mule.	Bad septic sinus hock and also side of tendons.	Did not operate	Put in one tube 15–1–18	Healed and discharged into Kraals 30–1–18.
25	Br. Gelding, Mule.	Splintered fracture of ext. angle of ilium.	Operated 1–1–18; removed pieces of bone and curetted.	Put in one tube	Healed and discharged into Kraals 15–1–18.
5	Bay Gelding, L.D.	Punct. wound kick; oil being discharged.	Did not operate	Put one tube in wound 24–11–17	Healed and discharged into Kraals 18–12–17.
11	Br. Gelding, Rider.	Open hock joint, result of kick; oil flowing out and one of the small bones fractured.	Removed piece of bone two days after treatment had begun.	Put in tube 12–12–17, or rather laid a perforated tube over wound, bandaging it on with gauze and bandage. Used irrigator and kept a constant flow of fluid over wound till oil ceased.	Oil ceased discharging on 20–12–17. Horse going sound and discharged into Kraals on 1–1–18.

13	Black Gelding	Over-reached jumping, severing both back tendons and laying sheath open with a gaping wound filled with mud, etc.	Cleansed wound thoroughly, clipping off pieces of necrosed tendon and flushing out with Eusol.	Put in one tube first, 7–11–17, right down between sheath and tendons. Small abscesses then appeared at pastern, were opened and had tubes put in, probably a lymphatic infection. Granulations appeared rapidly on edges of wound and were removed by scalpel and treated with a mixture of Cupri. Sulph. and Zinc Sulph. and as tight a bandage as possible. Calkins were tried on shoe of affected leg, but caused horse to knuckle and were removed.	Wound completely healed and horse walking on leg, 8–12–17, at present date he walks much better; tendons are working and there is practically no thickening.
28	Bay Mare, Rider.	Transverse wound of back tendons, only severing sheath and part of flexor perforatus; oil being discharged.	Trimmed edges of wound, which were granulating on admittance.	Put in tube 9–1–18, and used a bandage and granulation dressing on wound's edges.	Discharge ceased; tendon sheath healed 30–1–18. Wound still in skin.
31	Grey Gelding	Ulcerative lymphangitis, a discharging wound being present on outside of fetlock; horse going very lame and having a temp. of 103° F.	Did not operate	Put one tube into wound, and after wound got too small laid it on over wound, 28–1–18.	Temp. normal; horse standing on leg in three days. Wound ceased discharging and almost healed.

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SHOULDER LAMENESS TREATED WITH INJECTION OF COCAINE.

By R. HUDSON, F.R.C.V.S.
Retford.

HAVING arrived at a satisfactory diagnosis that the cause of the lameness is situated in the shoulder, which frequently presents considerable difficulty, injection of cocaine may give remarkable results, as shown in the following cases :—

What the actual cause of the lameness may be I cannot say. I have not known the precise history of the cases, which might give a clue to whatever tissue changes may have taken place. Local manipulation affords little help beyond atrophy of the muscle, often very slight, and possibly resulting from other causes. P.M.E. is rarely obtainable, and I doubt if it would lead to any definite conclusions. From the results obtained one might imagine that these cases may be of rheumatic origin. I am inclined to think that they originated in a sprain of the lower portion of the supra spinatus muscle and tissues in the immediate neighbourhood, which later takes on a rheumatic condition.

Case I.—A good sort of a sixteen-stone hunter. The history revealed that he had been lame many months, during which time he had been point fired along the metacarpal bone, and frequently blistered. My client saw him and borrowed him (being badly in want of a ride and low in finances), the owner being thankful to be rid of him. The new owner had him only a week when he was so lame as to be unridable.

I found him pointing well out, which the groom assured me he had done since he arrived. The foot, however, was cool, of good shape and appeared above suspicion. The shoulder muscles around the outside and front of the joint felt less than those of the opposite side, and the bony prominences sharp, but this might result from resting the limb.

Between the shoulder and the foot nothing could be detected. Movement at rest and in action showed nothing definite to me. We see so often "pointing" in connection with foot lameness that it is difficult to associate it with other lameness, but that it frequently takes place in shoulder lameness I am sure, though there is a difference in the way they point.

Liautard says: "The foot rests upon the entire plantar surface, instead of the toe alone, with the heels raised as in navicular arthritis," and if bedding is removed and the horse carefully watched this will often be found true.

Slight changes in the contour of the shoulder may easily be overlooked and passed over during manipulation. Having stood the patient on the level ground with all legs square, the head should be raised, and, standing directly in front of him, both shoulders should be carefully compared and any sharpness sought for. Then, still standing in front, the head being raised and held in a centre line, both hands should follow the line of the scapular spine, the scapular muscles and the region of the shoulder joint. A softness of the muscles (sup. and infra spinatus) at their lower extremity may be detected, giving also a sharper feel to the bony prominences.

Examination is often surer in the stable, because the horse is less restive. Swaying of the body when the attention is taken up with outside objects may interfere with a sure examination.

I had not given much thought to the difference there might be in the way a horse points, and so feel pretty certain.

Case I was a foot case, but I intended to make myself more certain by injecting cocaine over the plantar nerves and attempted the injection next day.

On trying to inject there was such a scene that I found it impossible. —the patient knowing about interference from previous experience. However, I got it into the shoulder in the fossa at the lower extremity of the supra spinatus muscle.

Having waited about ten minutes I had him trotted out and he went almost soundly. I then had him ridden on ploughed land and he went sound.

The horse did some two months' hunting, carrying a heavy hard rider, kept sound, and was sold at the end of the season for a good figure.

Case II.—A five-year-old fourteen-stone hunter gelding. The owner rode him in to fetch me to a colic case, and as he went away, after standing a short time, he showed great lameness, presenting quite a three-cornered aspect from behind. Enquiry revealed that he was a gift horse from a hunting gentleman who had passed him on as being incurable. I persuaded the owner to let me inject him, and did so a few days later.

Marked improvement was shown about ten minutes after injection. The horse was given three days' rest before trial by the owner, who, to use his own words, jumped him over every fence on the farm and could not lame him.

I had him out on several occasions and found him sound. After some weeks he was being ridden shepherding by the owner's wife when he suddenly pitched forward on to his nose, and remained down a considerable time in a state of semi-coma. Luckily the lady fell clear, but got such a shock that the owner sent him to the kennels, considering him unsafe to ride.

A good many cases have passed through my hands and shown excellent results. Two to four c.c. of ten per cent. solution has been injected, the point of injection gently rubbed, and about ten minutes allowed before trotting out.

From one to three weeks' complete rest in a box with good feeding is an advantage. The solution is injected 1½ inches deep.

Review.

PRACTICAL VETERINARY PHARMACOLOGY AND THERAPEUTICS.—By Howard J. Milks, D.V.M., Professor of Therapeutics and Small Animal Clinic. New York State Veterinary College, at Cornell University, Ithaca, N.Y. Pages, 518; well illustrated. Published by The Macmillan Co., New York and London. Price 22s. net.

This is an excellent book; it is well indexed, and the busy practitioner can soon look up the uses and effects of any drug he wishes to prescribe in animal ailments. Where prescription writing is carried out the would-be user of Latin terms will not make any errors if he follows the instructions herein. All the drugs in general use in the United States Pharmacopœia are referred to fully and many of the preparations only used occasionally are intelligently discussed.

This is the first book in which we have seen an account of the composition and method of using *arecovetrol.* The author deserves great commendation for the note on it. Our own druggists now ought to get busy in putting it on the market for veterinarians, especially if cattle practice is to advance. Under the text on common salt, we are rather surprised that its uses for gastro-intestinal lavage and method of employment in the dog has not been described or mentioned. Medicinal paraffin in canine practice is valuable. The author's note on it as an internal or external remedy is too short.

Chapter XXX, dealing with Bacterins, Serums, Vaccines, and Antitoxins, is useful, concise, and up to date.

Throughout the work the author's plan has been to enable veterinary surgeons to use drugs in a reasoned and intelligent manner, and many typical prescriptions illustrate the ways medicines may be dispensed. The binding and get-up of the book are excellent. It is a good standard volume to lie handy for daily reference and consultation. We think the author may be congratulated on having produced a comprehensive book which will add considerably to the technical knowledge regarding the uses and dispensing of drugs in daily practice. G.M.

THE LATE LIEUT.-COLONEL H. M. LENOX-CONYNGHAM, D.S.O., F.R.C.V.S.

THE

VETERINARY JOURNAL

Editor:

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Sub-Editor:

GLADSTONE MAYALL, M.R.C.V.S.

MAY, 1918.

Editorials.

THE INCLUSION OF HORSE FLESH IN THE FOOD RATION SCHEME.

The inclusion of horse flesh in the list of foods in the ration scheme has given official recognition to this commodity as a recognised article of meat dietary in Great Britain, and there is no doubt that it will speedily become as great a necessity amongst certain classes as it has done in the Allied countries. In France, Belgium, and Italy the horse butchers are prosperous men, and their shops in every way compare favourably in cleanliness and general sanitary arrangements with those of the purveyors of beef or mutton. The prices usually fixed by law are considerably less than those of beef, and the trade which is done affords ample proof of the popularity of horse flesh as a nourishing article of diet. For example, at the present moment in a certain town in Italy the official prices fixed by the Town Council for beef are as follow: The best joints, 3.50 to 4.40 lire per kilogramme, if purchased with the bones, or 5.60 lire without bone; whilst corresponding parts of horseflesh cost 2.40 lire and 3 lire respectively; there being no difficulty about selling all that can be obtained. Horse flesh is everywhere considered an excellent and nutritious food, and, except for the sentimental aspect of the question, there is not the slightest reason why it should not be made an issue ration to the Army just as much as beef or mutton. Everyone who has tasted it, and thousands of others who have eaten it unwittingly, speak well of it, and if nicely cooked and served in the same manner as a good beef steak it takes someone who is more than an ordinary epicure to detect the difference.

To officially recognise horse flesh as an article of meat food, for issue to the troops, would set free an enormous number of cattle for meat distribution at home, and would not by any means be unacceptable by the men themselves. Unfortunately, owing to the wastage of war there must always be horses to kill, and allowing them all to be sold to our Allies to supplement their food supply is a short-sighted policy which should be remedied. Horse flesh should be utilised to best advantage, and thus take its proper place with other necessary foodstuffs.

THE VETERINARY STUDENT AND THE CONTINUATION OF THE WAR.

In response to the urgent application of the General Medical Council the *bona fide* medical student who had been actively pursuing his whole time medical studies for six months prior to the war, and had passed the whole of the professional examination in chemistry, physics and biology (or botany and zoology) for a medical degree or licence, is permitted to be transferred (regardless of his medical category) to the Reserve for the purpose of resuming his studies with a view to obtaining a medical qualification.

When transferred, he must immediately resume his medical studies and enrol in an Officers' Training Corps, as otherwise he will be recalled to the Colours.

The *bona fide* veterinary student who was attending college before the war ought to be allowed the same privileges, for the veterinarian is of equal importance to the welfare of the country as his medical *confrère,* and the shortage of properly qualified professional men after the war is bound to be an appreciable one. The control of contagious disease amongst animals is very necessary if a country is to be prosperous, and the prosperity of England depends very largely upon agriculture. The training of a veterinary surgeon takes at least four years, and it is our duty as a profession to back up the College Council to the fullest extent in its efforts to regulate the supply to meet the demand.

Original Communications.

CONFERENCE OF OFFICERS OF THE FRENCH AND BRITISH ARMY VETERINARY SERVICE, HELD IN FRANCE, JANUARY 12TH, 1918.

(Concluded from April issue.)

IV—PERIODIC OPHTHALMIA.

By Colonel A. C. NEWSOM, C.M.G., D.D.V.S. (*Southern*).

THIS disease, though not existing in Great Britain to any alarming extent prior to the beginning of the present war, is known to have been well established in certain parts of Europe, America, Canada, South Africa, and India, where from time to time its presence has caused considerable trouble and no small amount of loss.

It first gave evidence of its existence amongst the animals of the British Expeditionary Force in France about the end of December, 1916, and since that time it has been steadily increasing in extent.

In 1891, Dr. Rolland, an ophthalmic surgeon of Toulouse, appears to have made a special study of the disease, and to have assigned its cause to the rheumatic nomad of Klebs.

Dr. Rolland made too strong a point of attachment of the iris to the crystalline lens as the one and only symptom of the disease; and from the fact that his opinion lacks the support of subsequent workers it is obvious that his views have not met with general approval.

In an American publication, dated 1916, it is defined as "an inflammatory affection of the interior of the eye, intimately related to certain soils, climates and systems, showing a strong tendency to recur, and ending in blindness from cataract and other serious injury."

This definition is unsatisfactorily vague and, in my experience, wrong, for, as far as can be observed, cataract is by no means a common sequel, since from a very large number of *post-mortem* examinations made it has been noticed that the appearance of cataract is really due to an opacity of the vitreous humour, and that actual disease of the lens is very rare indeed. That heredity plays an important part is probably beyond question; hence the legislation, which is more or less general in all countries where the disease exists, for stopping the employment of known infected animals for breeding purposes. That it should be looked on as a sequel of certain specific diseases (influenza, strangles, etc.) is an opinion largely held, but this view appears to suggest a want of definite knowledge.

It is possible that, given an inherited weakness, climatic conditions, attacks of debilitating diseases, bad feeding, overwork, etc., may all operate; but it is submitted that there must be some very definite influence operating to produce such definite consequences. All effort on the part of those working on this subject in the British Expeditionary Force to find a specific organism in an affected organ has failed, nor has it been proved possible to directly transmit the disease from animal to animal. That the primary condition is an iritis associated with ciliary inflammation (irido-cyclitis) seems beyond question, and that the other symptoms met with are the natural sequels of this inflammation there can be little doubt; but it still has to be learned what is the actual cause, and exactly how that cause operates.

Periodicity.—The thirty days assigned by French law as the probable limit of period of recurrence is not borne out by experience in the British Army. Cases have been met with in which, for no apparent cause, acute attacks follow one another with such rapidity as to suggest a continuance of the original trouble; and in other cases regular six monthly, or even annual, attacks have been seen.

Treatment.—In the hands of most operators in the British Expeditionary Force the injection of from 1 to 3 or 4 c.c. of Lugol's iodine into the supra-orbital fat has been found to cut short acute attacks.

In all cases the employment of atropine is clearly indicated and is always attended with good results, as not only checking the original iritis, but preventing the synechia upon the existence of which, in all probability, all further complications depend.

The local application of adrenalin and the internal administration of depletives are beneficial as directly influencing blood pressure.

When amaurosis has developed or, as often happens, detachment of the retina takes place, incurable blindness results.

In cases of cloudiness of the fluids of either the anterior or vitreous chambers, or of the cornea, good has been found to follow the injection of an 8 per cent. solution of common salt into Tennant's space in the case of the vitreous chamber, or under the orbital conjunctiva in the case of the anterior chamber or cornea.

No agent administered by the mouth has been found to do good.

Prevention.—In the absence of precise knowledge as to cause preventive measures can only be general. The conditions of life of the animal should be made as hygienic as possible in every detail, and till such time as a conclusion is reached it is perhaps as well to remove all actively infected cases from amongst the healthy with the least possible delay.

DISCUSSION.

General Moore remarked that this disease was causing him grave concern, and that in absence of knowledge of the cause the position in relation to it seemed somewhat hopeless. During the last year it had been gradually increasing, and to-day there were upwards of 2,000 animals under treatment. He did not look on it as a new disease, and he had himself known it for a very long time. In times of peace it had never been his experience to meet with many cases at one time; but with the number of animals at present in the Field it seemed more than ordinarily severe, and likely to cause a large amount of inefficiency and loss. He would be glad of any assistance from General Fray and his officers in regard to its elucidation.

Some weeks ago a meeting of Administrative Veterinary Officers was held, and certain questions were placed before them. The questions considered and discussed were the following:—

(1) Whether periodic ophthalmia is contagious or otherwise.
(2) The cause of it.
(3) Bacteriological investigation as to cause.
(4) Anatomical and *post-mortem* investigations.
(5) Circumstances attending incidence and increase of the disease.
(6) Conditions of horse lines in relation to the disease.
(7) Periodicity.
(8) Class of animals attacked.
(9) Stables *versus* open standings. Whether it was more common in stables or open standing.
(10) If locality had anything to do with the disease.
(11) If diet, water, period of the year, had any influence on it. Also if our calcium sulphide baths or other means used in the treatment of mange have anything to do with incidence.

After discussion on these headings had taken place, a policy was drawn up with regard to reduction of the disease and treatment. The opinion as to whether it is contagious or not is very varied indeed. Some officers are firmly of the opinion that the disease is contagious; but the majority considered it not so, though regarding it as a specific disease. Opinion as to cause is absolutely indefinite. Bacteriological investigation had failed to reveal any causal organism, and the anatomical and *post-mortem* investigation had likewise led to little or no satisfactory result. Most officers consider that the disease is just as prevalent in stables as it is in outside standings; and that diet, water, period of the year, and the calcium sulphide baths have nothing whatever to do with its incidence.

The opinion with regard to periodicity varied, and no particular class of animal seemed more prone to attack than others.

Policy towards Reduction.—The policy which has been adopted is a very long one, but the substance of it is that every case of ophthalmia, on being found, at once received an injection of 1 c.c. of Lugol's solution into the supra-orbital fat. Subsequently they are taken away from the units and sent to the mobile veterinary sections, which evacuate them to hospitals for treatment. This is the policy in brief. Affected horses in remount depots are evacuated direct to veterinary hospitals; endeavour is made to get all cases into special wards in each veterinary hospital.

A good many of the cases which were sent down from the Front diagnosed as specific ophthalmia were, in his opinion, not really cases of this disease at all. Anxiety on the part of veterinary officers to reduce the disease in their units is such that they may readily evacuate cases which are really not typical, but more in the nature of conjunctivitis, and simple ophthalmia. Up to the present the disease has not occurred in veterinary hospitals in the British Expeditionary Force, all cases coming from units at the Front.

General Moore further expressed the opinion that insanitation had a considerable influence in the production of specific ophthalmia, and again referred to the enormous quantity of manure and urine derived from the Army animals on the British Front, and said it would be difficult to believe that no deleterious effect on animals could result from such contamination. Notwithstanding this, the extent to which ophthalmia prevails is not great when compared with the number of animals in the Field.

The disease is also met with in animals newly arrived from overseas. Amongst 660 horses that were landed in the latter half of November, two showed active signs of ophthalmia, while three showed evidence of previous attacks. The next week's shipment revealed two more with active signs and three as having had previous attacks of this disease—that is, five out of 1,130. For this week, out of 1,000 we have had three showing active signs of the disease on coming into the country and four as having had the disease.

Major Nicolas said "Fluxion Periodique" (specific or periodic ophthalmia) was not considered by the French authorities to be contagious; but it was believed to be infectious, though no specific causal organism had been discovered. No proof had, however, been given as to its contagious character or otherwise.

Two different micro-organisms had been found in affected eyes, and these were thought by Professor Dor to be the specific ones in ophthalmia. Major Nicolas thought the divers organisms isolated from cases of ophthalmia pointed to the conclusion that various agencies were capable of determining the disease.

Apart from specific agencies, it had been thought that "slimy" forage might be a cause of the complaint.

In an outbreak of ophthalmia at Lyons, however, which caused considerable loss, no causal organism could be discovered, nor could it be proved that the disease was due to the fodder supplied.

French opinion favoured the influence of certain localities in the production of ophthalmia, and his own view was that humidity played an important part in causation. It had been noted that certain districts, notably the North of France, especially on the Somme, as well as certain stables, predisposed to the disease. In one place where horses affected with the disease were stabled, nearly all horses were affected. In another case a stable was noticed to be infected; it was disinfected and the disease disappeared.

Major Drouin observed that a large number of iritis cases or of "iridocyclitis" were simply secondary localisations of general infections, such as obtained in typhoid diseases, and especially of the one appearing in America under the name of "pink-eye."

Major Nicolas regarded the nature of the disease as very similar to that of "pink-eye," pericarditis, pneumonia, and pleurisy, but it was not in any way a sequel of those diseases.

He agreed with General Moore that the disease occurred amongst animals irrespective of whether they were stabled or placed on open standings.

As to the recurrent character of the complaint, he further said there was nothing in its clinical aspect to show whether it recurs or not.

Major Nicolas greatly favoured treatment with local application of atropine, 1 per cent. in oil or vaseline. This drug seemed to prevent or remove synechiæ, and generally minimise the extent of the lesions.

The principle as regards disinfection of stables occupied by animals suffering from ophthalmia was to deal with them as if the disease were due to some undiscovered specific agency.

V.—THE CONTROL AND TREATMENT OF MANGE AND OTHER CONTAGIOUS SKIN DISEASES.

By Major E. J. WADLEY, D.S.O., A.D.V.S.,

Headquarters Veterinary Directorate.

Although in peace-time mange is practically non-existent in the British Army, our experience in previous campaigns, notably that of South Africa, made us prepared to a large extent for what was likely to happen in this war.

History.—In the first twelve months of this campaign, by strict supervision mange was kept well under control, and the numbers affected were small; but as our army in the Field increased, supervision became more difficult, and in December, 1915, and January and February, 1916, the occurrence of the disease became more frequent.

Immediate steps for control were taken, with satisfactory results, the spread of the disease being checked. A recurrence to a slight extent occurred in July, 1916, which was again checked, only to reappear in March and April, 1917, when the maximum figures were reached; but the methods of control which I now mention were brought into force, with the result that in October and November, 1917, the numbers affected were reduced to a lower figure than they had been since March, 1916.

General System of Control at the Front:—

1. Rigid inspection of all animals daily by regimental officers, and report made should any be found affected or doubtful.
2. Regular weekly inspection of all animals of each unit by the veterinary officer in charge, and a certificate as to freedom from contagious disease rendered.
3. Immediate segregation of all affected and doubtful cases until seen by the veterinary officer.
4. Working isolation, as far as possible, for the remaining animals of the unit. Transfers of animals from an affected unit to another being forbidden.
5. Disinfection of all equipment, etc., under the supervision of a veterinary officer.
6. Transfers of all affected and suspected animals to the Mobile Veterinary Section, and subsequent evacuation to veterinary hospitals in special trucks which are marked, the animals being labelled and accompanied by evacuation rolls.
7. Disinfection by Army Veterinary Services of all railway trucks which have been used for sick horses.
8. The erection of dipping baths in corps areas, fully equipped with means for disinfection, and subsequently for drying, large quantities of harness, rugs, and equipment.

These dips are kept in constant use, as far as the military situation will allow, the incontact animals from affected units being regularly dipped. In addition, full use is made of them by other units with a view to prevention, as many as 3,000 animals passing through one bath in a week, and they have undoubtedly proved of very great value in controlling the disease.

Control in Remount Depots.—Similar steps for control have been taken in remount depots, all affected or suspected animals being immediately transferred to a veterinary hospital.

Varieties of Parasites Found.—It will be apparent from the foregoing that a certain proportion of the animals evacuated are found on further examination to be free from mange; but it has been found better to be on the safe side and clear units of all doubtful cases, than leave them with the certainty that a proportion will prove to be affected.

A record compiled by Colonel W. Pallin, D.S.O., of the results obtained from the microscopical examination of scrapings taken from a very large number of animals evacuated for mange and contagious skin disease, or as "close-incontacts," are of great interest as showing the frequency with which different parasites were found. Given in percentages, the figures are:—Negative, 24·71; lice, 1·71; sarcoptic, 46·15; psoroptic, 4·57; symbiotic, ·83; dermatodectic, 4·52; forage acari, 14·72; ringworm, 1·81.

Treatment.—All actual treatment is carried out in certain veterinary hospitals which are specially equipped and devoted entirely to this work. In the early stages of the war we depended upon sulphur made up with an oily base, such as lard, whale oil, or train oil (ol. picis, ol. tereb, or creosote being sometimes added); but it soon became apparent that, though valuable in treating individual cases, it was unreliable, expensive, and likely to cause damage to the skin when one was dealing with large numbers.

In January, 1916, we adopted the system used in Canada and other British Colonies, which is the complete immersion of the animal in hot solution of calcium sulphide. Specially constructed dipping bath, with a capacity of about 3,500 gallons, is filled with calcium sulphide solution prepared at the rate of 2½ lb. sulphur, 1 lb. lime, and 8 gallons of water, heated by direct steam to a temperature of 42·5° C., the animal jumping in and passing quietly through. These baths are repeated two to three times weekly for from three to seven weeks, according to the extent of the disease, the patient being groomed daily and washed once weekly.

The treatment is beyond question effective, even in the most advanced cases of sarcoptic mange, the only objection being that it is slow. The solution is non-poisonous, and non-irritant to the skin, as I have proved on several occasions by dipping a horse fourteen times in fifteen days. Tests have also been carried out with many other forms of treatment, but so far the only one bearing comparison with calcium sulphide is Cooper's arsenical dip, which has proved very efficacious.

SO_2 Gas.—As a result of the report published by Veterinary Major Lepinay, of the French Veterinary Service, this method of treatment has been tested in several of our veterinary hospitals. The first series proved conclusively its efficacy in psoroptic mange, but the results obtained, though encouraging, were not so satisfactory in advanced cases of the sarcoptic variety.

With the apparatus at our disposal we were only able to obtain a 2 per cent. concentration of SO_2 gas in the chamber, and it was thought that this was the reason of the failure.

With a view to rectifying this, the next series were carried out with SO_2 gas obtained from liquid SO_2 contained in iron cylinders under pressure. By this method a 5 per cent. concentration of gas was obtained in the chamber in fifteen minutes, and animals were exposed to it for varying periods of from 30 to 60 minutes. The results were, if anything, less satisfactory than the first.

It is worth remarking that the first series were carried out in the summer; the internal temperature of the chamber was about 24° C., and the patients sweated freely the whole time. The second series were carried out in November; the weather was cold; and although the animals were wetted before being put in, they dried rapidly and remained dry.

The points which would suggest themselves for discussion are:—

1. (*a*) Are the so-called forage acari pathogenic to the horse, and if so, which varieties; (*b*) What lesions do they cause, and can they be differentiated from those of sarcoptic mange? (*c*) Do any varieties of forage acari breed on the horse?
2. Is the demedox foliiculorum responsible for lesions in the horse, or is this parasite purely accidental?
3. *Treatment by SO_2 Gas.*—(*a*) Is heat or moisture, or both, necessary? (*b*) What percentage of gas and length of exposure is essential to ensure certain cure in cases of sarcoptic mange?
4. How long do corrugation of the skin and prurigo continue after an animal is cured of sarcoptic mange?

DISCUSSION.

General Moore stated that at the end of the winter last year many cases of mange existed in the British Expeditionary Force, but they were rapidly cured. The task of curing about 3,000 cases in two months was undertaken and accomplished. At the end of the summer mange gave little trouble; but now the winter is here it is increasing again, and no doubt by the end of the winter the number of animals affected will have assumed considerable proportions.

The most successful treatment adopted has been, undoubtedly, the calcium sulphide baths. Previously, treatment had been by application of sulphur with an oily basin, but it was found that debilitated animals with mange did very badly and lost condition rapidly. As a standard treatment this preparation was, therefore, abandoned, though still used for individual severe cases of sarcoptic mange. As a general rule, however, even these cases responded well to the calcium sulphide baths.

Treatment with SO_2 gas has been tried, but up to the present has not yielded uniformly satisfactory results. This winter a more extended trial will be given, as more suitable and larger numbers of cases will be available for experimentation than was possible when the method was first tried.

The process of generating the gas was a very simple one, artificers of the Army Veterinary Corps making the generators; but a sufficient percentage of gas—i.e., 2 per cent.—was not obtainable. Since then, liquid SO_2 has been tried, as this does away with the generator altogether, but whether it will prove better than the generator remains to be seen. It is very simple and very cheap, the cost being approximately 9d. per horse.

General Fray declared that if ointments are used, without the horse having been previously clipped, their action is very limited; whereas if clipped a debilitated animal may die from exposure. This being so, he thought it would be found impossible to have any effective treatment for severe cases at the Front. Mange ointments were only suitable in mild cases.

With regard to the treatment by SO_2 gas, General Fray did not consider that the gas generator had been perfected yet, and that no doubt a better and more efficient one would be forthcoming later on. He considered, however, that the apparatus used by the French Veterinary Service was very good. His experience with this system of treatment proved to him that it was necessary to generate heat in the gas chambers as well as the gas, in order to render the parasiticide action of the gas effective. A heavier density of gas—for example, 5 per cent.—was not of itself sufficient to kill the parasites in the skin; a 2 per cent. density, plus 30° C. of heat was, in his opinion, required. This probably explained the better results Major Wadley had obtained when the SO_2 was generated from sublimed sulphur by heat, even at a concentration of 2 per cent., than when he used liquid SO_2 at a concentration of 5 per cent. without heat.

The sulphurous anhydride method for the treatment of mange, in his opinion, was good, and therefore to be recommended. It was essential, however, to ensure a sufficient density of gas and an effective temperature.

The affected animal must remain at least one, and even two, hours in the sulphurated chamber.

General Fray, continuing, said that mange was a disease arising out of a debilitated condition of the animal, such condition being largely induced by insufficiency of food which prevailed at times, and the difficulties attending the grooming of animals at the Front.

Two species of acari were often met with in the same animal—viz., the sarcoptic and psoroptic, which were responsible for causing generalised mange.

Questioned as to whether it was advantageous for the horse to be wet when brought into the chamber, General Fray said that the matter was disputed. He thought it better that the horse should not be wet before being submitted to the SO_2 treatment, because the action of the gas dehydrates the tissues of the parasite.

Cure is often attained after two sulphurous anhydride baths, with a twelve days' interval between them.

General Moore stated that in the British Army animals were sent down from the Front as soon as mange was observed, whilst in the French Army he understood that only those were evacuated which it was deemed impossible to cure at the Front.

General Fray remarked that the British Veterinary Service were very fortunate in being able to evacuate their mange cases in that way. It was not possible for the French to do the same.

With regard to the influence of forage acari on the horse, General Fray expressed the opinion that those organisms were not pathogenic, but that they undoubtedly caused a certain amount of pruritus, as was the case with lice.

NOTES.

Major-General J. Moore, C.B., opened the Conference with introductory address, which varied only very slightly in detail from introduction already drawn out.

General Fray, in reply, said he had the honour of bringing to General Moore and his officers the hearty greetings of the French veterinary officers, whose feelings he was there to express. General Moore had had the happy and kind thought of assembling in Abbeville authorised representatives of the Allied Veterinary Corps, and wisely deemed that they would greatly profit by knowing each other better; by exchanging their views and impressions about the good working of their services; and, lastly, by reciprocally benefiting from the clinical observations of each other from their therapeutic experiments, and the results gained as regards treatment of the diseases prevailing in their Forces. General interest, veterinary science, and good comradeship had much to gain from such friendly meetings as General Moore had been good enough to initiate. General Fray congratulated General Moore on his having been recently promoted to the rank of Major-General.

Major-General Moore briefly thanked General Fray for his kind words.

NOTE ON THE RESULTS OF A CERTAIN NUMBER OF OPERATIONS FOR LARYNGEAL PARALYSIS ON ACTIVE SERVICE.

By Colonel NEWSOM, C.M.G., D.D.V.S.

Army Veterinary Service.

That Laryngeal Paralysis should make its presence felt amongst the animals of the British Expeditionary Force was inevitable.

Very early in the campaign it became evident that inefficiency from this cause was high enough to justify operative measures in dealing with the disease provided it could be shown that animals could be made workably sound within a reasonably limited time as the result of such measures.

A few special cases were selected for operation by certain special surgeons, and as the results of these proved that under normal conditions a fair proportion of otherwise useless animals could be made workably sound in from five to six weeks, it was decided that the operation should be generally adopted.

In determining whether or not operative interference should be resorted to the following points were considered :—

Age.
Condition.
Conformation.
Degree of respiratory distress evinced when called upon to perform work of the class to which each patient belonged.

Speaking generally, no animal was operated on unless :—

1. Not over 14 years of age.
2. In fair condition.
3. Of good conformation, dependent upon its class.
4. So seriously affected as to be incapable of performing the ordinary work of its class.

The following figures give the results for nine veterinary hospitals on Southern L. of C.

No. operated upon.	Average time.	No. discharged to duty.	No. unsuccessful.	No. remaining.
410	6½ weeks.	364	30	16

In the early operations the majority of operators used the fingers, and generally stripped both ventricles, but latterly the Burr has come into more general use, and as a rule only the affected side is interfered with.

The general after-treatment has been to keep the patients quiet and to interfere as little as possible with the wound. When the external wound has healed walking exercise is begun and gradually increased until the fourth or fifth week, when a trial can be given.

Every animal discharged for duty is subjected to a severe test prior to discharge, and none are passed which are not fit for the particular work of the class to which they belong.

The number of absolute cures are not recorded except in one hospital, which reports as follows.

No. operated on.	Completely cured.	Cured and Workably sound.	Died or destroyed.
187	50	132	5

These figures give a rough result of 27 per cent. complete cures and 70 per cent. sufficiently relieved to do good work.

That the cure or relief has been permanent in all instances cannot be claimed, since from time to time cases have found their way to hospital in which severe laryngeal changes have developed as a sequel to the operation, but in proportion to the numbers dealt with the figures on this account have been very small.

TREBLE STRANGULATION OF THE ILEUM IN A HORSE.

By Captain R. C. G. HANCOCK,

A.V.C. (*Special Reserve*).

A BAY GELDING RIDER received a feed of oats mixed with chaff at 3.45 a.m. At 5.15 he was taken out and ridden 3½ miles. He was led home, arriving back at camp a few minutes before 7 o'clock. The only notable occurrence while he was out was that a few hundred yards from home on the journey back he shied and reared at a car. On arrival at camp he was taken to the water-trough. After a few gulps he lay down, rolled, got up, and refused to drink further.

After unsaddling it became evident that he had colic. He was walked about until seen by the sergeant A.V.C., who gave an ounce of chloral hydrate at 7.30. Short, sharp spasms occurred at intervals of a few minutes. At 9.30 a.m., when I visited the animal, I found him lying on the left side, sweating and exhausted after a bout of struggling. Respirations accelerated (24); temperature 98°; pulse imperceptible; mucous membranes anæmic.

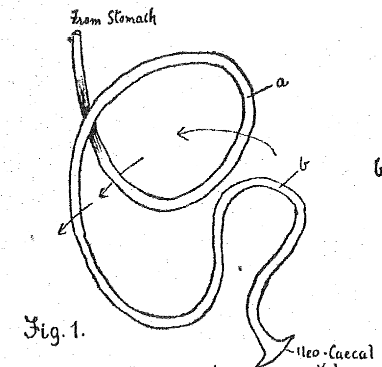


Fig. 1.

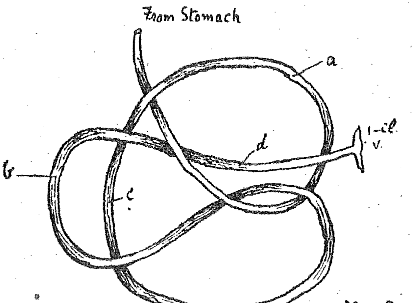


Fig. 2.

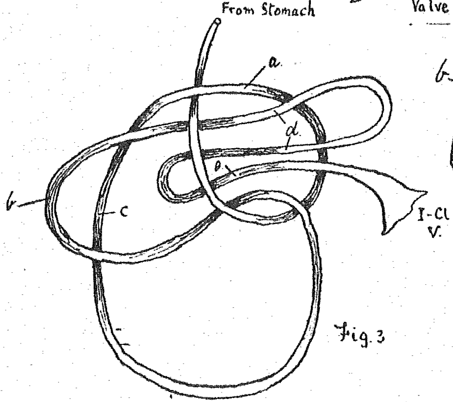


Fig. 3

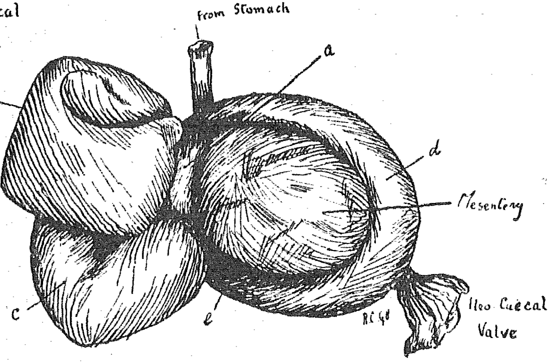


Fig. 4.

Rupture of the bowel, or gangrene supervening on twist, were suggested by the symptoms.

After my departure, the horse got up and appeared considerably better. At 11.30 pulse was 42, temperature still subnormal. Four drachms of aloes were administered. Intermittent colic, but less marked, occurred throughout the rest of the day and through the night. At 11.30 a.m. of the following morning the horse died.

At the *post-mortem,* when the abdominal cavity was opened, a quart of blood-coloured fluid escaped. The stomach and bowels were removed for examination. The former was opened, and nothing abnormal was noted, save that the quantity of food appeared considerably greater than the feed alleged to have been given at 3.45 a.m. the previous day. The small intestine was normal in appearance throughout its length, until the last part of the ileum was reached. Here a complicated knot of strangulated bowel was found closely opposed to the large intestine. For examination the knot was cut out. Considerable difficulty was found in analysing the knot, partly from its complexity, partly from its extreme tightness. A sketch was first made (Fig. 4), and then the loops were loosened. With the aid of a piece of string the structure of the knot was reproduced.

Fig. 1 shows the original loop (*a*); into this loop a second loop interposed itself in the manner shown by the arrows, eventually lying as shown at Fig. 2 at (*b*). To further complicate this, a third loop of bowel between (*d*) and the ileocoecal valve (Fig. 2) became included in the original loop (*a*). Then the tightening of loop (*a*) on these two secondary loops led to strangulation of all three (Fig. 3). The letter references in Fig. 4 are placed as in the three preceding diagrams.

The length of bowel involved in the knot was just under a yard.

SOME REMARKS AND SUGGESTIONS ON THE VACCINE AND SERUM METHODS OF TREATMENT OF ULCERATIVE LYMPHANGITIS (LYMPHANGITIS ULCEREUSE-NOCARD).

By Captain E. A. Watson, C.A.V.C.,
A.V.C. Bacteriological Laboratory, B.E.F.

During the past nine months 35,000 doses of vaccines and serum have been supplied by the A.V.C. Bacteriological Laboratory to various Units, for treatment of ulcerative lymphangitis.

There are many difficulties and possible sources of error in arriving at definite conclusions as to what can be accomplished by vaccine and serum therapy in this disease, but commenced in time, and fully carried out on the principles of immunisation, it is unquestionably superior to any other method of treatment that has been employed. The evidence already produced and figures given in the different reports and returns indicate that a very large percentage of affected animals treated by vaccine methods recover and are cured. But, unfortunately, there is no positive evidence or reliable data, except in the case of a few experimental animals, as to the duration of the recovery and immunisation, or to show whether the disease is actually or permanently cured, or only tolerated, and apt to recur. There are grounds for belief that recovery is more or less complete. Certainly, for the period the animals remain under continuous observation we do not meet with recurrences that made the earlier methods of treatment, other than by vaccination and immunisation, appear so discouraging and hopeless, but the period of observation has been all too short to permit of a definite conclusion.

Fresh exacerbations and recurrences are characteristic of the usual course of ulcerative lymphangitis, and it is of the utmost importance to ascertain whether or not the remarkably good results following vaccine and serum treatment are permanent or temporary.

To obtain the necessary evidence on this much-debated point the following suggestions have been made :—

1. A large number of horses that have to all appearances completely recovered from ulcerative lymphangitis as a result of vaccine treatment should be kept under direct and continuous observation for a period of six months at least. Such animals could be permanently employed for transport work in veterinary hospitals, convalescent horse depots, and in local transport camps in touch with veterinary units, where frequent inspection can be made and a careful record kept.

2. Only such animals should be selected —
   (*a*) As have undergone a full course of vaccine treatment or immunisation, and of which a complete record has been kept, and
   (*b*) Which have exhibited unmistakable evidence of the disease.

3. The history of the cases, and all data as to severity and extent of the lesions, complications, sequelæ, etc., should be carefully recorded.

4. Animals should be divided into groups or series according to different methods of vaccination or immunisation employed. For example—
   (*a*) Anti-Preisz-Nocard bacillus.
   (*b*) Polyvalent mixed vaccine (Preisz-Nocard Bacilli—Streptococci and Staphylococci).
   (*c*) Prepared pus vaccine.
   (*d*) Serum.

5. The number of animals in each group could be added to from time to time, according to accommodation available and the facilities for observation. Fair evidence could be obtained from groups of fifty horses; but it may be possible to employ a lesser number in some Units, and a greater in others.

The animals employed in the above connection should be specially marked or branded.

A suggested plan that all animals treated for ulcerative lymphangitis should be branded offers a number of disadvantages. In the first place there would be a number of cases of doubtful or inaccurate diagnosis; secondly, there would be no distinction between those treated by vaccines and serum and those by other methods; and, finally, it would be very difficult or impossible to collect accurate data, or follow the subsequent career of the majority of the branded animals scattered over the country.

Much more valuable information will be obtained from a limited number of cases held under close observation under the conditions indicated above.

In reports and returns coming in on the treatment of ulcerative lymphangitis, there are still to be noted sources of error, and a grouping tending towards misleading conclusions.

For example, in the last report from —— all cases admitted are included in the summaries, namely, 1,400. Of these, 229 were destroyed. An analysis of these 229 shows 105 more sent away without treatment at all, and 16 after treatment by other means than vaccine. And of the 108 sent after vaccine treatment it is admitted that many were sent a few days after arrival at the hospital. To judge of the efficiency, or otherwise, of a method of treatment, only such cases should be considered in which the method and course recommended has been fully carried out, and only such cases in which the disease is not so far advanced on admission for treatment as to make a recovery a remote possibility.

On the other hand, the number of cases given as cured may be overestimated, for there is a marked tendency to discharge such animals as cured as soon as the existing lesion has dried up, which may be after only one or two injections of vaccine, and without any regard to the principles of immunisation which underlie the vaccine and serum methods of treatment.

There is one point upon which all observations and opinions agree, and that is the importance of commencing the treatment in the early stages of the disease. When this is possible the results are excellent, and the available evidence, though not conclusive, indicates that in such cases, and after a full course of treatment, the cure is complete and permanent. The duration of the immunity is not known—it is, in fact, relative, and not absolute. Experimentally it is possible to re-infect an animal two to three months after a course of immunisation, but in such cases only a very mild lesion has developed, and quickly healed, and the result is a higher degree of immunity for a further period. In such manner it has been possible to hyper-immunise animals against enormous doses of virulent cultures. It has also been established that treatment commenced when the disease has reached an advanced stage, when secondary and even multiple pyogenic infections have ensued, involving tendon sheaths, bursæ and capsules of the joints, is of little avail. Hardly any other result could be expected under such conditions, and obviously the conclusion is to commence treatment in the initial stages.

There is usually an interval of a week to ten days between the development of the first ulcer, or abscess, and the second, and every effort should be made to commence the vaccine treatment during this interval. A supply of vaccines or sera sufficient to enable the first dose to be given at the Reception Hospitals, Mobile Veterinary Sections—or, better still, in the Unit where and when the disease is first diagnosed—and the continuation of the treatment at the veterinary hospital will save a great many animals for further military service.

APPENDIX.

Experimental Series G. (A.V.C. Bacteriological Laboratory):—

For a comparison of the results following subcutaneous injections of different preparations of vaccines and immune serum.

Twenty horses were selected out of 100 or more affected untreated animals in order to provide a series of similar cases characteristic of the disease in its not too far advanced stages, but sufficiently established to thoroughly test the efficacy of the modes of treatment. Each animal exhibited typical lesions of the disease—one to three discharging abscesses or ulcers in the region of the fetlock or hock. The twenty horses chosen were subdivided into four very similar groups of five—A, B, C, and D.

SERUM AND VACCINES.

1. The *serum* was obtained from horses immunised to large doses of virulent cultures af Preisz-Nocard bacilli.

2. Anti-Preisz-Nocard vaccine was prepared by the alcohol-ether method.

3. *Polyvalent mixed vaccine* contained mixed strains of pyogenic streptococci, staphylococci, and Preisz-Nocard bacilli, originating from ulcerative lymphangitis lesions.

4. *Pus-vaccine* was prepared from pus collected from unopened abscesses and from purulent kidneys in cases of the disease. Micro

examination of the pus showed the presence of Preisz-Nocard bacilli, and from the pus pure cultures had been obtained.

TABULATED SUMMARY OF RESULTS.

	Period of Observation.	Completely healed. Apparent cure.	Nearlyhealed Probable cure.	Slow progress.	Lesion persist or recur.	Total number of cases.
Group A.	21 days.	3	1	1	—	5
,, B.	,,	2	3	—	—	5
,, C.	,,	4	1	—	—	5
,, D.	,,	2	2	1	—	5
		11	7	2	—	20
Group A.	50 days.	2	—	1	2	5
,, B.	,,	5	—	—	—	5
,, C.	,,	4	—	1	—	5
,, D.	,,	2	1	1	1	5
		13	1	3	3	20
Group A.	70 days.	3	1	—	1	5
,, B.	,,	5	—	—	—	5
,, C.	,,	5	—	—	—	5
,, D.	,,	2	2	1	—	5
		15	3	1	1	20

TREATMENT.

Group A.—15·0 c.c. serum daily for twelve days, followed by pus vaccine at intervals of four days—3 to 5 doses in all. Finally, three cases not progressing very well received two injections of polyvalent mixed vaccine.

Group B.—15·0 c.c. serum daily for twelve days, and in addition on the first day and at subsequent seven-day intervals anti-Priesz-Nocard vaccine.

Group C.—Anti-Preisz-Nocard vaccine only; five to seven injections at seven-day intervals.

Group D.—The five animals in this group received 14, 10, 9, 8, and 8 injections of pus vaccine, respectively. In addition, three cases not doing well received two doses of anti-Preisz-Nocard and two doses of polyvalent mixed vaccines.

The results are given in tabulated form below.

The best results were obtained in Groups B and C, in which all cases remain apparently cured, and in which no fresh lesions developed during the seventy days period of observation.

In group A two cases showed persisting or recurring ulcers, and in group D one case.

Rapid improvement follows the use of serum and pus vaccine or of the latter alone, but it is not always maintained. The pus vaccine is not rich enough in Preisz-Nocard bacilli to produce the required amount of anti-bodies to overcome severe infection.

The number of animals in the above series is too small to permit of final or definite conclusion, but the results confirm those obtained in previous series as to the remarkable efficacy of anti-Preisz-Nocard bacillus vaccine, and indicate the superiority of that method of treatment.

An anti-Preisz-Nocard B vaccine sensitised with immune serum is now in preparation, from which still better results may be looked for.

TREATMENT OF INJURY OF THE SPINE IN THE DOG BY SUSPENSION.

BY G. MAYALL, M.R.C.V.S.
Bolton.

ON April 4th I was called to a fox terrier dog that had been knocked out by a motor. I found him lying prostrate, quite unable to stand, with considerable pain over the loin region and abrasions on the right eyelid and forehead. He was brought into the infirmary and treated with doses of pot. iodide and nux vomica, and rubbing of the loins with soap liniment. He improved somewhat up to April 8th, when he was able to stand when supported, but the posterior half of his spine took a semi-circular shape, and he had little control over his right hind leg, and seemed partly paralysed on one side. I was anxious to do all I could for the patient as his master wished me to spare no trouble and expense, and the dog was a good plucked one. On April 8th, however, I felt things were rather at a standstill, so I consulted my old friend "A Dictionary of Treatment," by William Whitla, M.D. There, under "locomotor ataxia," I found some lines on Charcot's method of suspension in spinal lesions and locomotor ataxia. The method in human treatment is to suspend the patient by the chin and occiput with some slight support—in heavy patients by arm straps. Half a minute is sufficient for the first suspension and subsequent ones should extend to two or three minutes. Three theories are founded on the treatment: (*a*) Charcot believes that suspension acts like a nerve-stretching operation, and that at the same time important changes in the circulation take place ; (*b*) Lauder Brunton believes that it acts like massage on a muscle, and thus insures the removal of waste products and lymph, at the same time increasing the processes of repair and oxidation by promoting a freer blood circulation ; (*c*) Althaus suggests that suspension produces its good effects by stretching and breaking down the newly-formed connective tissue resulting from inflammatory changes about the posterior nerve roots (which exerts pressure upon the nerve tubules) and thus enables them to resume their functions, if not already destroyed.

I did not suspend this dog by his jaws and occiput, but after putting him on his back and working his hind legs by flexion and extension for a minute or two, I then held him up by his hind legs clean off the ground for a minute or so twice daily, and finished the performance by giving him a shake down, while holding him so that there was tension on the hind legs and spine. After the third day there was a visible improvement. The spinal curvature was straightened and the right hind leg began to come in normal use. The dog now walks about quite well, and I am hoping the recovery will be permanent.

HEPATIC ECHINOCOCCI AS A MECHANICAL CAUSE OF CHRONIC TYMPANITIS IN CATTLE.

By Henry B. Eve, M.R.C.V.S.,
Folkestone.

Subject.—An aged, roan cow, half-bred, unthrifty ; looked like a tuberculous subject.

History.—The owner informed me that the cow seemed to suffer from chronic indigestion, and had encountered repeated attacks of "hoven," for which complaint he had periodically treated her himself, and given various patent medicines which had only temporarily relieved her. He had dieted her as far as possible, consistent with the war rations, but without success. The cow was barren.

Symptoms.—The usual ones were present, indicating "hoven," appetite varied, rumination irregular, the animal appeared dull, listless, pot-bellied, and grunted, frequently grinding its teeth. Icterus slightly present.

Diagnosis.—"Chronic Tympanitis," perhaps resulting from a foreign body present, or enlarged mediastinal tuberculous gland, complicated by liver disease (gall stones).

Prognosis.—Unfavourable.

Treatment.—Punctured rumen, and left canula in position for a week. Administered various medicinal reagents, *e.g.*, chinosol, terebene, acid carbolic, sodae hyposulphite, direct through the medium ot canula, to counteract fermentation, which gave relief for a few days. Later on removed canula, and gave internally, soda bicarb., zingib, gentian, nux vomica, and pip cayenne and ammon. carb. in gruel. Applied mustard externally. Gave salt in feed.

Result.—Disappointing; animal began to lose flesh, so advised slaughter, as both myself and owner were fed up with the case.

Post-mortem.—The liver was tremendously enlarged, simply invaded with "multilocular echinococcus cysts," weight about 60 lb. at a guess. Ascites present, also echinococcus cysts in lungs. No lesions of tuberculosis present. The stomachs were normal, and no gall stones.

Remarks.—The cysts had ruptured in places.

I conclude that the enlarged liver mechanically produced the tympanitis by exercising pressure upon the œsophagus and prevented the eructations which are physiologically necessary to oxen. I surmise that the fluctuations in the intensity of the tympanitis, which were observed, may have been due to rupture of the cysts, with consequent temporary decrease in size of the liver, and, of course, some abatement of pressure.

P.S.—Owner wouldn't pay for tuberculin test.

NOTES OF A CASE OF COMPLETE DISLOCATION OF THE LEFT FEMUR IN A COW, WITH ROUGH DIAGRAM SHOWING THE CHARACTERISTIC RECUMBENT POSTURE.

By Capt. A. R. ROUTLEDGE, F.R.C.V.S.
Army Veterinary Corps.

On being called as a second opinion to a recently calved milk cow I learned that ten days ago she had slipped her left leg outwards in turning away from the water trough, the ground around being very greasy; with assistance she hobbled to a shed, falling twice on the way, went down and had not been on her legs since.

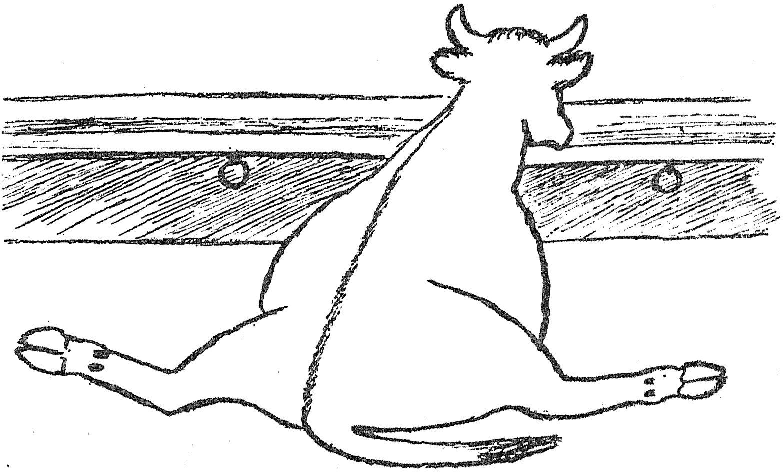
She appeared quite comfortable in a normal position, except that the left leg was at right angles and away from the body. On being coaxed to rise she got on her knees, but as soon as an attempt was made to raise the hind quarters, the left leg slipped outwards and she gradually slid on to her udder and could not be persuaded to make another effort to get up.

On examining her per vaginum, the articular head of the femur could be distinctly felt in the obturator foramen; when an assistant abducted the limb it moved, and the limb could be carried upwards almost vertical to the spine. She was promptly shot.

The specimen shows: — 1. The ruptured ligamentous tissue forming the hip joint still adhered to the socket joint.

2. Wearing away of the bony rim of the cotyloid cavity, especially at its posterior part.

3. A well marked groove on the head of the femur between the articular head and great trochanter where the dislocated femur had been "riding" on the internal edge of the ischium, the bone being worn quite smooth.



Characteristic recumbent posture in dislocation of the femur (left) in cow.

I had a similar case about six years ago, the cow having had a bad slip in a railway truck.

SARCOPTIC MANGE IN THE DOG AND PURULENT OPHTHALMIA IN A BULL BITCH.

By G. MAYALL, M.R.C.V.S.,
Bolton.

THREE Pekingese spaniels were brought in on April 2nd, suffering from sarcoptic mange. They were dressed with an ointment made up of 1 part of styrax, and 1 part of sulphur to 8 of lanoline and vaseline mixed, to which a little menthol was added. The ointment was applied every other day. The redness and irritability of the skin soon declined under this treatment, coupled with the administration daily of two tablets per dog of stannoxyl finely powdered and mixed with sloppy food. On April 13 they were given a nascent sulphur bath, and were sent home in a good state.

Bull bitch "Betty" brought into the world by Caesarean section, performed by me two years ago, had sarcoptic mange badly round about the face and eyes, and on the neck, and the great irritation had caused the bitch to paw her eyelids so much that the eyes were badly inflamed, and both discharging a purulent matter which collected in the corners and under the lids, and made the bitch a sorry object. I made a lotion of boracic acid and zinc sulphate to which a few drops of adrenalin were added, and cleansed the eyes daily with it. The mange was treated with the before-mentioned ointment. Internally three stannoxyl tablets powdered were given daily. Under this treatment the bitch improved greatly, and the purulent discharge lessened considerably in quantity, and gradually disappeared. There is an opacity of the lens in one eye and some cloudiness in the other eye, but the bitch has vision enough to enable her to get about fairly well.

One of the Pekingese dogs voided a number of worms whilst under treatment with the stannoxyl. The effect of the drug on the skins of all the dogs was good, and the medicine certainly seemed to lessen the discharge in the case of purulent ophthalmia. All the dogs took the medicine quite well in the powdered form when mixed with the food.

BRAXY: WITH SPECIAL REFERENCE TO THE DISEASE AS SEEN IN NORTH CARDIGANSHIRE.

By E. MORGAN, M.R.C.V.S., D.V.H.

BRAXY is a sudden, acute disease of young sheep which runs a rapid course and usually terminates fatally. This disease is known by different names in different countries, and even in the same country the appellation may vary—thus in Cardiganshire it is best known as "Dwfrcoch" (Red-water) and "Gwaewr Hydref" (Autumn colic); in Scotland as "Braxy" or "Redbraxy" and "Sickness"; in Ireland as "Braxy"; in England as "Red-water"; while in Germany, Denmark, Norway and Iceland it is known as "Bradsot" or "Braasot." The universal term, however, is *Braxy*, which apparently means—"sudden sickness followed by sudden death."

In Cardiganshire there is no other disease so much dreaded by the sheep farmer as braxy. It may be called a seasonal disease, as it is observed almost exclusively from September until the end of January, and of these months November is the worst. Young sheep, under one year old, usually fall victims; only on rare occasions have I noticed a case in sheep over that age.

I am unable, owing to want of statistics, to give the actual percentage of losses, but I know that in some parts of Cardiganshire it is rather high; I have seen it on our own farm as high as 35 per cent. of the lambs. Sheep farmers who winter their lambs away from home, down in the lowland, make careful enquiries beforehand as to whether the farms are subject to braxy, and if they learn that the percentage of deaths during the previous seasons was not above 5 per cent. they will not hesitate to hire the farm for the winter, provided other conditions are suitable.

From enquiries made from old farmers in the district, braxy seems to have been even more prevalent years ago than at present, but it must be borne in mind that not only is sheep farming now carried out on far different lines, but that this disease is chiefly responsible for the introduction of many of the new methods. Farmers used to keep their wether lambs until they were one or two years old. The farmers on the high hills still adhere to the old custom of keeping them until about four years old; these stand a better chance during the winter than those of the small farmer on the hillside who keeps all his lambs at home, and has consequently no choice to make, but the farmers who run a large sheep-walk up the mountains tack their lambs on hired farms down the lowland, and they know which farms are free from braxy. There is yet another class of farmer who sends his sheep up to the mountain in summer as tack sheep. He, as well as many of the small hillside farmers, used to keep their lambs and sell them as store wethers when they reached the age of one or two years, but owing to loss from braxy, and for other reasons, they now either feed them early in autumn for the butcher—or (if a small hillside farmer) sell them to another farmer lower down the vale, who does the fattening up. Note the difference in the number of wethers at the Tregaron market in the spring to what it was about twenty years ago. Many farmers are afraid to run the risks of braxy, and often sell some of their best ewe lambs as well as the wether lambs.

Although, apparently, this disease has ravaged the flocks of Cardiganshire from time immemorial, most writers on the subject consider Wales to be free from the scourge. Perhaps the local terms in use for the disease may, to a certain extent, account for this error, but it only proves how little attention has been paid in the past to the diseases of sheep, not only in Cardiganshire, but throughout Wales. I admit that before I went up to Scotland I was under the impression that the braxy of the Scotch sheep was a different kind of disease altogether to the red-water of the Welsh ones, but being interested in sheep, it was not long before I learned that they were similar diseases. In order to further satisfy myself, as well as some other students at the Liverpool School, I had more than one carcase and parts of carcases sent up from home, by which means all doubts were cleared up. Since that time I have dropped the old term "red-water" and use the universal one of "Braxy," as I consider it is advantageous to do so.

Professor Hamilton, of Aberdeen, in discussing upon one occasion this particular disease, said—"We Scotch are proverbially a long-suffering race, but in this matter it seems to me that those having their interests centred in sheep farming have erred through over-forbearance." Would not the above remark apply still better to us in Cardiganshire? Here there are diseases of sheep which no one in the past has considered worthy of attention. We must, however, give credit to the Scotch, who have spared no pains in investigating the causes of and how to cure the diseases of sheep. The same cannot be said of the Welsh, though this may be due, as Professor Hamilton remarked, to over-forbearance, but the fact remains that there are diseases, such as "Louping ill" (Trembles), "Cryndod," "Clefyd du," and various others, which have been up to the present without names, at least in Cardiganshire.

The Highland Society furnished Professor Hamilton with a grant of money for the purpose of carrying on researches in regard to braxy, and I understand that again during the last few years a similar grant has been provided by the Development Commission (through the Board of Agriculture for Scotland) to enable a further study of this disease to be made.

In looking over some very old literature on diseases of animals, it is interesting to note that the diseases of sheep were, at one time, engaging a good deal of attention, but the work was conducted under great disadvantages, as the knowledge of bacteriology was then in a very elementary stage. In "The Book of Husbandry"—a volume published in the sixteenth century—I have found some most interesting information about the different diseases of animals. Braxy is here termed the *Blud*, and is described as follows:—

> "There is a sykenes among shepe, called the blud. The shepe that hath it will dye sodainly or he wyl stand styl and hange downe the head and other whyle quake. If the shepherds can espy him, take him and rub hym about the hede and especially about his ears and under his eyen and with a knife cut of his eares in the mydst and also let him blede in a vain under his eyen and if it bleede well he is lyke to lyve and if he bleede not, then kyll him and save his flesh, for if he dye himself the flesh is lost; and the skin wyl be far ruddier like blud more than another skin shal be, and it taketh most commonly of the fattest and best lyking."

The above description, although written in the year 1575, should appeal to everybody who has seen a case of braxy as a good description.

I see that the author of another book refers to *braxy* and *red-water* as two separate and distinct diseases, but from his description one can clearly see that they are really one and the same.

Even at the present day in Cardiganshire, many farmers believe that what they call "Gwaewr Hydref" and "Dwfrcoch" are also two different diseases. It is true that Gwaew (colic)—*per se*—occurs in sheep, but it is not nearly as prevalent as it is supposed to be; when, however, it does occur, the lamb more often than not recovers. Hence the reason for the belief that braxy cases need not always terminate fatally.

A great variety of opinions have existed, and still exist, concerning the cause of braxy. We shall, therefore, make it our aim in this paper to supplement the portion of truth we have ourselves found with that discovered in the past. Many of the theories may not be completely right, and perhaps none are completely wrong, but as most of them are based upon an ultimate fact, we may reasonably assume that some essential verity can be looked for. Furthermore, several important discoveries have germinated from the experiences of past observers, as instanced by the case of James Hogg (better known as the "Ettrick Shepherd") who, from the time he was a small boy tending sheep, was possessed of superior powers of observation, the results of which are beneficial to this day. In Hogg's boyhood, "Sturdy" (Bendro) was the most prevalent disease among sheep, and this caused him a good deal of trouble until he found the following easy method of relieving it. I quote from his own writings :—

"When I was a youth, I was engaged for many years in herding a large parcel of lambs, whose bleating brought all the sturdies in the neighbourhood to them, and with whom I was everlastingly plagued, but as I was frequently knitting stockings, I fell upon the following plan : I caught every sturdied sheep that I could lay my hands upon, and probed him up the nostrils to the very brain with one of my wires. I beheld with no small degree of pleasure that by this simple operation I cured many sheep to different owners, but I kept all my projects to myself, for I had no authority to try my skill on any of them."

Hogg's Views on Braxy.—"The disease commences about the middle of October, and the universal ravages of the young flocks through all hardy districts and farms in the nation set in early or late in proportion as vegetation ceases early or continues till a later period of the season. In the middle of autumn the hoggs are put into rich pasture—they do very well on it, until the frosts commence, often very suddenly ; causes the plants to become dry and astringent, and the temperature of the air acting upon the bodies of the animals induces them to search after and feed more upon heath, bent, and other herbs of a more hardy and hot nature. They devour these with great voracity. This causes braxy. The heath being as costive and hard of digestion as the other is soft and easy, the consequence is now easily seen through—at least by a man of science—but as it is easier for me who am no anatomist to conceive than to describe, I shall not follow out its process farther for fear I make a fool of myself, and they who do so get many to help them. That the above is the cause of that braxy which has cut off so many thousands of excellent young sheep not the least doubt need to be entertained. Any shepherd will tell you that it is on sudden changes from fresh weather to a frost its ravages are most felt."

Cure.—Hogg tried various medicines, but without success. He finds "bleeding good," or if "they purge."

Prevention.—" Do not overstock the land," he says. " Pasture the young and old together. They should be shopped in the upper parts of their pasture for two hours in the morning. Let them not be suffered to remain too late on the grassy parts below, but again soon be put in motion outward, so as not to impair the stomach by too immoderate fills of this grass. Bleeding about two ounces of blood from the jugular vein early in November."

I have received some useful information regarding braxy, as well as other diseases of sheep in Cardiganshire, from Mr. Lloyd, Pant. Tregaron, who, like James Hogg, has been from boyhood a keen observer, and has furthermore had every opportunity of seeing the " pranks of nature in her wildest moods." Braxy used to be prevalent on his farm, occurring between the end of September and the end of January. The worst outbreaks took place upon the appearance of a sharp frost, or, worse still, a hoar frost. Then one could see, in the early morning, where the sheep had been resting the night before. Freezing after a prolonged course of wet weather is also very bad. He states that he never saw a single case of recovery. The sheep die very soon after the first noticeable symptoms of illness. Most cases occur during the night and are found dead in the morning. Lambs in good condition are decidedly more liable to the complaint than those in poor condition. Mr. Lloyd hardly lost any of the lambs kept on the mountain during the braxy season, but lost those kept down in the fields. Deaths occur equally on well cultivated ground and on poor uncultivated land where rank pasture grows. He lost few animals while feeding them on turnips and corn, but rank pasture—where cows have been grazing during the summer, *i.e.*, tathy patches—is a predisposing cause of disease. He considers fine pasture or seed fields harmless, but that mossy land is bad. Barren ewe lambs, he asserts, are more liable to the infection than those which are in lamb. Long continuation of wet weather is not favourable for the disease, and sun aspect, or *vice versa*, makes no noticeable difference, but he recommends shelter as a good preventive. He tried the pig dung treatment, and lost no lambs that season. But as some seasons are more favourable than others to the lambs, he is not sure whether it was due to the medicine or not. The latter had, however, a bad effect on them for they seemed to cease thriving, and did not begin to improve until the spring.

Braxy, as already stated, is pre-eminently a disease of young sheep. There are various other diseases amongst our domesticated animals which have this same characteristic, namely, of being diseases of the young. The older animals seem to have acquired immunity, while young, against some of these youthful complaints. For instance, " Sturdy " or " Gid," as well as Lincolnshire lamb disease, are all far more prevalent among young sheep than among older ones. The same may be said again with regard to the distemper of dogs, the joint-ill of foals, calves, and lambs, and to various other complaints. Nor is this rule confined only to animals, applying similarly to the diseases of children.

Black Quarter of Young Cattle.—This resembles braxy in many respects, the young animals being far more liable to contract the disease than the older ones, and it is often those in good condition which fall victims to the complaint. An abundance of gas-producing bacteria are found, consisting in both cases of rod-shaped organisms. Black Quarter also resembles braxy in that it runs a rapid course and usually terminates fatally.

Braxy, as we have already seen, generally makes its appearance with the first outbreak of hoar frost, and, as a rule, lambs in good condition—*i.e.*, lambs with a fair proportion of kidney and omental fat—suffer most. The majority are taken ill at night and, more often than not, are found dead in the morning. Obviously the disease runs a rapid course, as the majority of lambs I found thus dead had been apparently quite well on the previous evening. Although on several occasions I have seen cases of braxy illness during the day-time, my experience is that they most frequently occur at night. Wether lambs suffer more than ewe lambs, and if the latter are in lamb they are less liable to contract the disease than the barren ones. Again, lambs which are born in February are less liable to infection than those born later, but the younger the lamb, the less are its chances of survival over the dangerous period. On rare occasions lambs are born very late in the season, about July, and if such are allowed to follow the mother continually, they generally survive, owing to the fact that they get a little milk and maternal care.

The disease often breaks out during sudden weather changes. A prolonged course of snow, rain or frost, is not so unfavourable to the lambs as is a change from mild weather to frost (or hoar-frost), or, on the other hand, to rain or a sudden thaw after snow or frost, as any such changes mean a chilling of the body, which seems to open the door for the enemy to enter.

The causal organisms of braxy, according to Dr. McGowan, Edinburgh, or at least the organisms belonging to the same group as those which he believes cause braxy, are normally inhabitants of the mouth and nose of sheep. When the vitality or resisting power of the body is lowered by a sudden chill, or by eating frozen, indigestible grass, these organisms immediately seize the opportunity of making an unexpected attack, in full force, upon the body guard. In view of chills, therefore, it is dangerous to turn lambs into the open late in the evening, especially if they have been heated after a journey, or in any other way. In my opinion, November is quite the most trying month.

One year in particular, I remember seeing as many as five lambs dead one morning within a small area; they were all, apparently, healthy the previous night. That was one of the worst seasons within my recollection; we lost 35 per cent. of our lambs, most of which were wether lambs. These had been weaned about August 25th—the usual time to bring lambs down from the hills, the ewes being left behind until the end of September. I remember one farmer in an adjoining parish, who took exception to this custom. He always allowed his lambs to follow the ewes to the mountain, bringing them all down together to the farm in the month of October. He failed to see that the object of bringing the lambs down from the hills in August was to improve their condition, the pig dung drench being given them in September to reduce the accumulated fat. I understand that this farmer rarely lost a lamb from braxy.

The worst place on our farm was a field, near the farmyard, into which the cows were turned at night, until about August. In any place where cattle have rested at night, a great amount of tathy patches are always to be found. The lambs were more affected in this spot than anywhere else on the farm, and being near the house, we often saw some of them soon after they were taken ill. One season in particular, when the death rate from braxy was specially high, we began to suspect that these taths, or tufty patches, had something to do with the cause of the disease. We decided at last to keep them away from this field, and after doing so, saved the remainder of the lambs that season. This goes a long way to prove that tathy patches are, at any rate, a partial cause. Virgil, who seemed to know a good deal about the diseases of sheep, said: "Nor in too rank a pasture let them live." I have seen hungry horses turned into a field full of these taths, and after eating greedily, suffer from severe attacks of colic; they may well, therefore, be guarded against.

In this parish are two adjoining farms, of which the situation and nature of the soil are in all respects identical, and both have a southerly aspect. The hill on these farms is composed mostly of dry land, partly covered with heather, while the lowland consists of a mixture of marsh and arable land. One farmer allows his lambs to feed, for certain hours during the day only, on the lowland, always driving them in the afternoon slowly up the hill, where they spend the night. The percentage of deaths on the farm is almost *nil*. The adjoining farmer now and then drives his sheep up the hill, but more often than not neglects to do so. Some seasons the death rate from braxy has been very high on this farm.

There are those who believe that turnips are apt to cause braxy, but I, on the contrary, have found them good preventives, though care must be taken not to allow the lambs too long a time in the turnip field for the first day or two, otherwise they are apt to die, not from braxy, however, but from tympanitis, that is if the leaves or tops are attached to the turnips. Turnips act as an aperient—most essential for young sheep when the foggage gets dry.

One year, when braxy was particularly prevalent on our farm, we decided to turn the lambs into the turnip field, allowing them also the run of an adjoining field as well; by so doing we saved all the rest of the lambs. I have also proved that good seed fields are the best pasture for lambs when braxy is prevalent in other places. Feeding with corn, along with turnips and hay, or even without the latter, is also another excellent preventive of this disease.

(*To be continued in next issue.*)

Translations.

DOUBLE-SIDED EXTENSIVE CYSTS AT THE FRONTAL END OF THE WOLFFIAN DUCTS IN A COW.

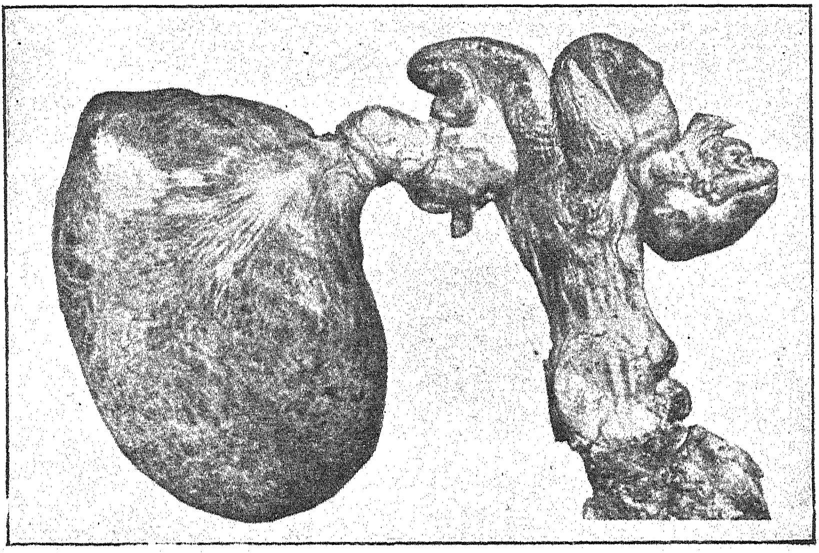
By Dr. E. WYSSMANN, *Neuenegg.*

The condition present and described in this cow was seen after slaughter.

Anamnesis.—The cow had been purchased by the owner in the middle of June, 1916, as in calf, but soon afterwards came in bulling. On July 11 I examined her as to pregnancy and found her not to be in calf. My note at the time reads, "indurated ovaries, especially the left one, prognosis unfavourable." The owner accepted my opinion, and did not take the cow to the bull, although she was constantly coming on heat, and showed normal tension of the pelvic ligaments. Finally the cow was sold, as she was only giving 10½ pints of milk a day, and was visibly improving in flesh. Occasionally the owner had noticed a yellowish discharge from the vagina, and a marked distension of the abdomen before feeding.

Pathological condition.—No special changes in the uterus; weight (without the vagina and cyst contents), 1¼ kilos. In the vagina in front of the externalos was a ½ inch vertical rupture. At the frontal end of the left ovary there was a strong, undulating cystic bladder glistening, areolated, and brownish violet in appearance. Its dimensions were 9 inches in length, 7 inches broad, and 2½ inches thick. This sack-like bladder arose from the neighbourhood of the ovary.

and had a short neck and fine, reddish, branching vessels on its surface. The internal surface of the cyst was smooth, except at the neck, where it was roughened. The weight of the cyst with its covering was about 16 lb. The contents was a clear, dark golden yellow, alkaline, and markedly albuminous fluid, which formed no sediment on standing or boiling, nor yet with the addition of hydrochloric or acetic acid, or alcohol. The neck of the cyst completely surrounded the left ovary, which was about the size of a chestnut, and contained a large, yellow body. Only a small piece of the fallopian tube remained, because it had been cut off short, and a great portion was left in the abdomen. Similar conditions were found in the right ovary, which contained a graafian follicle about the size of a hazelnut, and a small, yellow body, and was surrounded by a thin walled transparent cyst, as big as a man's fist, and yellowish red in appearance.



Uterus of a cow with double-sided extensive cysts at the frontal end of Wolff's duct.

This case is neither one of ovarial cyst in its true sense, nor one arising from disease of the tube ; but a cyst originating from the frontal end of Wolff's duct. It is known that in embryonal development Wolff's duct is absent in numerous cases in female ruminants, and further, after birth the remains of the same shrivel up. Gartner's ducts also, according to Roder, become obliterated with the senile atrophy of the sexual organs.

It cannot be said what was the cause of this great serous cyst on

Wolff's duct, since no history of previous pregnancies was obtainable. The function of the ovaries was not entirely stopped by the cyst, as was proved by the frequency of œstrum. The cyst had obtained a point of support from the filled rumen, as ring shaped tissue strands on the frontal end of the neck showed. The cyst was certainly not an embryonal abnormality, and repeated earlier pregnancies had not hindered the development of the cyst.—*Swiss Veterinary Journal.*

G. M.

TWO NEW FEEDING-STUFFS.

FEEDING OF HORSES ON MARINE ALGÆ.

DEPUTY M. DUBOYS-FRESNEY asked the Minister of Agriculture and Foodstuffs, whether, in reference to the feeding of horses on marine algæ, all measures had been taken to intensify and hasten the preparation of this food, which if distributed abundantly would allow agriculture to preserve a large quantity of its hay ; and whether adequate measures had been taken to recover the by-products from the washing of the seaweed, such as soda, iodine, etc. (Question of October 9th, 1917.)

Answer.—The preparation and use of marine algæ for the feeding of horses is still in the experimental stage, and the results obtained are only of a laboratory value. The industrial trade is yet to be created. To encourage it, it is proposed to make contracts for the sale of the whole production for one year on condition that the price does not exceed that of oats. According to the latest information received, a first factory, which will be putting out stuff at the end of 1918, is in process of construction at Pan-an-Lam, near Pleubien, district of Tréguier. As for the question about the recovery of sub-products from the washing of the seaweed, this concerns specially the province of the Minister of Munitions and War Products. At the proper time it will be the subject of special attention by this Minister.—*Revue Gén. de Méd. Vét.*, January 15th, 1918.

NEW FOOD FOR CATTLE.

At the "Instituto de Emisiones" of Stockholm a Swedish and German patent has been taken out in connection with the obtaining of cellulose as forage. The manufacture of this forage is being proceeded with immediately. It has been demonstrated by successive analyses over a number of years that the cellulose obtained from cut wood chemically elaborated will serve quite well as a food for cattle and makes forage of excellent quality. During the war this problem has been closely studied, and the experiments made have always given very satisfactory results. In Germany this forage is based on a product obtained from straw ; recent experiences, however, show that the cellulose of wood constitutes a large field for the elaboration of food destined for animals. It is evident that it does not contain the substance of ordinary forage. But by the admixture of fat in the production of cellulose the new food is in no way inferior to those known. The "Instituto de Emisiones" is doing great research work, and furthering the building of special factories and workshops for the manufacture of cellulose. Cellulose is the first material elaborated in the manufacture of bisulphates and bisulphites. Alcohol is distilled in the production of cellulose. A factory at Stora Kopparberg is proceeding to manufacture 20,000 tons of the forage. Another factory and workshops are being put up at a cost of 500,000 crowns for the manufacture of cellulose as forage. Trading in the product will commence in February, 1918.

Dr. Riman, in Sweden, has obtained a product from cellulose which he hopes to turn to use as human food. Besides the new food for cattle, further elaboration will produce a foodstuff that will go well with flour and economise it. Spain wishes to take up this new industry, as its forests and woody regions are quite suitable for the establishment of such.—*Revista de Higiene y Samidad Pecuarias.* G. M.

Abstract.

A NEW VISION OF AN OLD PLAGUE.

By B. R. ROGERS, D.V.M.,

Chicago, Ill. (*American Jour. of V.M.*)

THREE MILLION NINE-HUNDRED-AND-FORTY-SEVEN THOUSAND tuberculous pigs were found by Government veterinary inspectors in 1917 among the 40,000,000 hogs reaching packing plants having federal inspection. Most of the same old tuberculous cows that infected the bulk of these pigs are still retained on certain unknown farms. The cows are the real source of the trouble, through their milk and discharges, and the hogs are simply the signal and signboard pointing to the perennial spring of infection. In 1915 328,000 pigs were tanked for disease, and removed from the meat supply. This is more hogs than any one of seven certain States produce, and if healthy and available for meat supply these pigs would maintain an army of several thousand soldiers for a whole year, because most hogs are marketed at less than one year of age. During the calendar year 1918 most of the 6,000,000 farmers will market some hogs, and of the 60,000,000 hogs now on the farms, about 40,000,000 will reach the packing houses where Government inspection is maintained, and the inspectors will find over 3,000,000 probably 4,000,000, tuberculous hogs before January 1st, 1919. The pigs are chiefly infected from the cows. Shrœder found 40 per cent. of reacting cows passing tubercle bacilli in the fæces. Hogs eat fæces and become proportionately tuberculous. Dr. Rogers is strongly in favour of the owner's name and address being marked by a tag in the ear of each hog sold, so that all hogs may be traced back to their source, and the cows found that spread the disease.

Demonstrations to farmers of infection of pigs by cows would in the author's view, be educative, and secure the goodwill of the farmer. This could be done by putting an affected cow in a pen along with two or three healthy pigs, or in contact with them, the pigs being fed with some of the fæces and also some of the first milk and water used to wash out the feed box of the cow. The cows and pigs may be slaughtered in about six weeks to two months, and the lesions inspected. Veterinarians, officials, and farmers should be asked to attend and observe the final slaughtering.

[There is no doubt that the tuberculosis question as affecting the pig is becoming more important every year, and to economise the meat supply, and eradicate the disease, the situation in all pig producing countries is worth consideration and needs controlling.—Sub.-Ed. *V.J.*]

Notice.

STANNOXYL.

Stannoxyl is prepared from tin and metallic tin free from lead. It is put up in the form of greyish tablets, which are used for adults in a dose of four to eight daily in the treatment of diseases arising from staphyloccal infection such as carbuncles, anthrax, acne, styes, etc. In furunculosis, from which not a few of our soldiers have suffered, it has proved an excellent remedy, and Dr. A. Compton recorded several cases treated successfully with stannoxyl, in the *Lancet* for January 19, 1918. The tablets and literature pertaining to the preparation may be obtained from the Anglo-French Drug Co., Ltd., Gamage Buildings, London, E.C.1.

In dog practice we think that stannoxyl will prove a welcome addition to the internal remedies suitable for skin complaints.

Reviews.

Notes on Parasitic Anaphylaxis and Allergy.—By L. Van Ess and A. F. Schalk. Bulletin No. 125. North Dakota Experiment Station.

The authors have been investigating further the theory advanced by the Seyderhelms that the larvæ of gastrophilus act as intermediary hosts or carriers in the spread of the infectious anæmia of the horse. The conclusions they come to after conducting numerous experiments do not support the views of the Seyderhelms. The authors, however, consider that anaphylactic poisoning of a more or less chronic nature due to parasites may produce such diseases as anæmia, cirrhosis, or parenchymatous degenerations. Bot. material and a solution of the secretions of the larvæ were injected into horses and experimental animals, but in no case was any diseased condition similar to swamp fever produced. A reaction was established in horses and other animals by material from various other parasites (ascares megalocephala, dipylidium caninum, taenia serrata, etc.). Eye and intradermal tests also produced reactions. The authors throw out the hint that through some of these reactions it may be possible to identify animals which act as carriers of harmful and destructive parasites, *e.g.* cœnurus cerebralis of sheep. G. M.

THE RHODESIA AGRICULTURAL JOURNAL. Edited by the Director of Agriculture, assisted by the Staff of the Agricultural Department. Published twice monthly; price 5s. per annum. Printed by the Argus P. & P. Co., Ltd., Salisbury, Rhodesia.

This October number, although for economy reduced in size, chiefly by the adoption of smaller type, contains much that is valuable and interesting. The cattle industry of Rhodesia has secured a marked step forward by the establishment at Odzi of the Rhodesia Meat Packing Co. Crop experimentation at Gwebi has been very much alive, and the work done may be slightly understood when it is stated that 475 acres of land were under crops, 250 distinct plots were cultivated, and 34 different crops were handled. Mr. J. M. Sinclair, M.R.C.V.S., has a practical "note on Quarter Evil," in which he expresses the opinion, as opposed to a view held by Mr. A. Stewart Richardson in an article in the "Journal," that the manufacture of vaccine locally is not necessary. Mr. Sinclair instances the fact that the whole of the vaccine supply for the United States (a much larger country than South Africa) is manufactured at Washington from the one and only type of the disease known. African Coast Fever shows a considerably diminished mortality figure, due to the institution and better carrying out of the process of dipping.

Mr. A. M. Fleming, M.B., C.M., D.P.H., discourses well on the part played by malarial parasites and mosquitoes in the spread of malaria and blackwater, and the Nature Notes by Father O'Neil and Miss Chamberlain on "Snakes" and "Case Weavers" respectively are full of interest.

The Veterinary Report gives disease statistics and indicates the effect of tuberculin and mallein tests on imported bovine and equine stock.

An article on "Maize Foods" will no doubt be welcomed by many readers.

The contents of the "Journal" show that real live progress is being made in Rhodesia, and that the "Journal" itself is playing an important part in the advance. G. M.

Obituary.

THE late Lt.-Col. H. M. Lenox-Conyngham was born at Moneymore, Co. Derry, and was the youngest son of Sir William and Lady Lenox-Conyngham. After taking his B.A. at Trinity College, Dublin, he spent some time in Florida, orange growing, but having a great passion for animals he returned to take up his veterinary studies at the Royal Veterinary College in London, graduating in 1896. In 1897 he joined the Army Veterinary Service, and was immediately sent to India. Between 1902 and 1904 he served in the Somaliland Campaign, for services in which he was mentioned in Despatches. In 1904 and 1905 he was on remount duty in the Argentine, being again sent to India in 1909.

On the outbreak of the great European war he went to France (September 1914) as A.D.V.S. to the Sixth Division, and his appointments during the war have included those of officer commanding No. 10 Veterinary Hospital and D.D.V.S., Fifth Army, under Sir Hubert Gough, K.C.B. For services rendered in this capacity he was mentioned in Despatches by Sir John French and Sir Douglas Haig, being awarded the D.S.O. and gazetted Brevet Lt.-Colonel.

Unfortunately his health broke down under the severe strain of war service, and he was invalided home to England in 1917. After a brief rest he was posted as Officer Commanding Tunbridge Wells Veterinary Hospital and from there transferred as A.D.V.S. of the Western Command. It was whilst holding this appointment that he was taken ill and died quite suddenly. He was a man of endearing qualities and sound common sense, much liked by all with whom he came in contact, officers and men alike. The profession can ill afford to lose such men at any time, especially during the serious exigencies of the present war. He leaves behind a widow and two children to mourn his loss.

NOTICES.

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VÉTÉRINAIRE INSPECTEUR FRAY,
FRENCH ARMY VETERINARY SERVICE.

THE

VETERINARY JOURNAL

Editor:

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor:

GLADSTONE MAYALL, M.R.C.V S.

JUNE, 1918.

Editorials.

SOME SEASONAL DISEASES OF WAR.

ROUGHLY speaking, in order to do the greatest good to the greatest number, the organisers of the Veterinary Hospitals have at least some ten or twelve particular groups or headings of disease to provide for; and it is astonishing how, just as in civil practice, only to a much more overwhelming extent, these have their seasonal proclivities, and have to be specially catered for in times of stress and pressure.

It has often been observed in daily practice how, if a case of an unusual malady comes along, it is very frequently followed by others, and in the large veterinary hospitals this is quite the rule, for very large portions of the hospitals have to be set aside for a certain class of disease, which presently dies out, and in a week or two the same proportion of hospital wards will be filled up by a totally different set of patients suffering from a totally different type ot malady.

Mange, above all others, seems to be a seasonal affair, the greatest rushes being in the late winter and early spring, the non-disturbance of the long coat being a fruitful factor of its undiscovered presence. In the wet and winter months thousands of debility cases are sent down from the Front, and if the winter is very wet and muddy (and France and Flanders seem to be always muddy), the bacillus of necrosis plays havoc with the skin of the coronet and fetlocks. Ulcerative cellulitis, too, is much worse in some districts than in others, whilst periodic ophthalmia has become such a serious problem that the question of the satisfactory disposal of the large numbers of good young horses which have become blind, and therefore unsuitable for work at the Front, is one which takes a lot of solving. Glanders, thanks to the skilled use of mallein, is no longer feared, and the advances made in the control of this disease have removed one of the biggest enemies to efficiency in the horse units of all armies. That some skilled scientist may discover cures, or diagnostic agents, on similar lines for the other troublesome and serious diseases is the wish and hope of every Army veterinary officer, and indeed of every civil practitioner, too, who has large studs or bodies of horses to deal with.

Above all, we on our part must take every precaution to avoid the admission into Great Britain, after the war, of these diseases which are working such ravages on the Continent, and which are at present an unknown quantity in our country. The Veterinary Sanitary Service will be put to as severe a test then as it has ever had, but it will have behind it the practical experience gained by many hundreds of members of the profession whilst acting as officers in the Army Veterinary Service during this great war.

THE NECESSITY FOR THE PROPER CARE OF HORSES AND MULES DURING THE PRESENT WAR.

In no previous war has the benefit of a properly organised veterinary department been better demonstrated than the present one, and on no previous occasion have the salvage arrangements for dealing with incapacitated animals (whether from wounds or disease) been so complete.

Once a horse or mule gets put out of action it becomes a terrible responsibility and care to the unit to which it belongs, and the fighting units are only too thankful to have the means of evacuating it to a place where it can be properly taken care of; especially as by so doing it has a very high prospect of being again converted into a useful part of the fighting machine.

The Veterinary Corps really becomes a huge salvage corps which, from an economic point of view, deals with tens of thousands of pounds of waste material (for a sick animal always becomes a waste product for the time being) and restores it back to utility and value for the benefit of the tax-payer.

The fighting units at once get rid of the incubus, being thus able to continue their plans unimpeded by the loss of men and time which veterinary attention would necessitate, and the whole machinery of war progresses again. Regular veterinary inspections of the horses for the prevention of contagious disease and the evacuation of sick to mobile sections, finally to reach veterinary hospitals, have become as essential to the " carrying on " of the army in warfare as is the care of the health of the men. The one could not " carry on " without the other, and those who said that the horse had had his day and was a useless encumbrance and expense during the present struggle, have only to read the accounts which appear from time to time from the war correspondents, in our daily papers, to understand that the horse and mule are even more essential to-day than they were in the wars of our ancestors.

In some of the mountainous fronts, for example, motor traction is impossible, and everything, food and ammunition, has to be taken to the front line trenches on pack animals ; and on most fronts, owing to the bad weather and the torn-up state of the roads, nothing can be taken except on pack-saddles to within two or three miles.

A recent extract quoted from the report of Mr. Hamilton Fyfe, the *Daily Mail* correspondent, illustrates well from the sentimental side and the utility side the necessity of skilled veterinary care in the conservation and treatment of the suffering animals. He says: " The horses are having a great deal more work to do than during the trench warfare. How they add to the picturesqueness of war, but how much also to the pitifulness of it, when one sees them, as I have lately, lying by the roadside.

" There was a touching scene a few days ago not far from Moreuil. Some dragoons on the way to hold up the German thrust came under heavy shell fire and a number of horses were wounded. Their riders had to leave them. They could not be left to die in lingering pain, so there was no way for it but to end their sufferings at once. It was hard for the men who loved their patient, gentle mounts, and who had only just been reunited to them after a separation while the troopers were employed as infantry, to shoot their comrades as they lay. Many of them had tears in their eyes ; some were seen to turn their heads away as they pulled the trigger. The poor beasts, torn in flank or belly by fragments of shell, turned on their masters with looks of wondering reproach.

" No one who cares for horses could have seen this episode of open warfare without emotion. It passed quickly. There was no disorder. Troopers knew what was necessary to be done, and did it. Then they formed up again, those who had now no horses becoming foot soldiers, and they went on and kept the enemy back, putting all the more ginger into their fight from the thought of their horses which they would never see again.

" Proudly and sturdily go the gun horses, even in the rain. As I passed a battery to-day, with the officer enveloped in his waterproof riding in front, and the drivers humping their shoulders on their limbers, or in their saddles to keep some of the wet off, I thought how much better off we are for horses than the enemy. He has been using small, Russian ponies for transport work, and we have heard of some German batteries which now have no horses of their own. They have to borrow them from the transport when they move. This does not affect the heavy artillery, which is moved by tractors, and seems to be coming up in large quantities at a steady pace."

That the horse and mule can never be done without, and that there will always be horsed units in every Army, is a certainty, and so long as that is the case we may rest assured that we shall always have an outlet for our professional brethren in the shape of a well-organised and well-equipped Veterinary Corps. The latter can never again fall back to the small unit it was before the war, and considering its phenomenal and rapid growth it reflects the greatest credit on those who were responsible for the original plans and lines upon which it has been run.

Original Communications.

ACTINOMYCOSIS.

BY MAJOR J. H. TAYLOR, M.C.,
Army Veterinary Corps.

Subject.—Bay rider, about 12 years old, belonging to Divisional Ammunition Column. This horse had been awkward to manage at times, but showed no inclination for sexual intercourse. He had been sick for about a week, and as he showed no signs of improvement, I was asked by the Veterinary Officer in charge of the unit to consult with him.

Symptoms.—The horse stood in one position, with no inclination to move. Pulse, temperature, and respirations normal. The buccal membrane exhibited sloughing patches and there was a most offensive odour from the mouth. Urine normal in colour, but scanty in quantity; contents of rectum hard and covered with mucus. Entire disinclination for food. Drank a little water linseed gruel. Loss of condition very marked.

Treatment.—Antiseptic mouth wash, mag. sulph. in drinking water, and ammon. carb. balls.

Prognosis.—Very unfavourable, and it was decided to slaughter if the animal got down and was unable to rise. During the night the horse fell down and was destroyed.

Post-mortem.—The *post-mortem* made the next day proved very interesting, and I think almost unique. Lungs, heart, and liver normal. There was atrophy of the left kidney and hypertrophy of the right kidney, this latter organ being three times its normal size. The right testicle was suspended in the abdomen; its structure had undergone fatty degeneration, but the spermatic cord and epididymis were distinctly discernible. A large growth, fully 28 lb. in weight, involving the mesenteric glands in the region of the kidney, was found. At first sight this was thought to be tuberculous. A portion was, however, sent by me to the O.C. No. 20 Mobile Laboratory, who very kindly made a microscopical examination and reported that it was a case of "Actinomycosis."

The case being so uncommon, a short report may interest the members of the profession.

NOTES ON TREATMENT OF ULCERATIVE LYMPHANGITIS FROM NOVEMBER 18TH, 1917, TO JANUARY 11TH, 1918.

BY CAPT. A. J. HINES, A.V.C. (T.F.).

SUMMARY OF TOTAL CASES ADMITTED TO HOSPITAL.

Cured.	Destroyed.	Died.	Cast.	Remaining.	Total.
595	229	2*	2	572	1,400.

*One of these arrived dead in train.

Cured animals are sent to No. —— Hospital, —— . A certain percentage have, in addition to ulcerative lymphangitis, other diseases, such as mange, ophthalmia, etc. These secondary diseases are treated at No. —— Hospital; but when lymphangitis is cured they are then transferred to No. —— , irrespective of the condition of the other diseases with which they are affected.

Altogether, 634 animals have been discharged from No. —— Hospital to No. —— as cured, but 39 cases have been returned here, having had a recurrence of the lymphangitis.

Animals, previous to December 20th, 1917, had been treated with Preisz-Nocard vaccine or treatment other than by injections. The summary of cases treated up to that date is as follows:—

Up to and including December 20th, 1917—

Cured.	Destroyed.	Died.	Cast.	Remaining.	Total.
383	24	*Nil.*	2	703	1,112

On December 18th, 1917, Captain Watson, C.A.V.C., paid a visit to No. —— Hospital, bringing with him, in addition to Preisz-Nocard vaccine, a supply of prepared pus and serum. He requested that these should be tested against each other. Sixty animals were, therefore, selected and divided into three twenties, each twenty containing a similar number of mild, medium, and advanced cases.

In the case of the animals treated with serum, it was intended after seven days' injection to subdivide this group of twenty into two groups of ten, continuing the daily injections of serum with the one group, and in the case of the other proceeding to vaccine treatment with Preisz-Nocard vaccine. It was, however, found that at the end of seven days the supply of serum was exhausted, so the whole twenty were therefore treated with Preisz-Nocard vaccines.

Group No. 1.—*Serum.*

Cured	9
Doing well; no discharge from ulcers, but requiring a few days for superficial wounds to heal	5
Requiring further treatment	3
Doubtful cases, possibly destruction	3

Group No. 2.—*Pus.*

Cured	12
Doing well, but requiring a few days for wounds to heal	2
Requiring further treatment	2
Destroyed	4

Group No. 3.—*Preisz-Nocard Vaccine.*

Cured	8
Doing well, but requiring further time	9
Doubtful case, possibly destruction	1
Destroyed	2

Group No. 1.—Treatment consisted of injecting 15 c.c. of serum daily for seven days, and then proceeding with Preisz-Nocard vaccine, commencing with 2 c.c., and increasing the dose by 1 c.c. each week. Local treatment consisted of well washing with saline solution. Exercise was given whenever possible; but the roads having been so slippery lately, exercise had unfortunately to be abandoned on several days. Remarks as to local treatment and exercise apply to all three groups.

Group No. 2.—In this case treatment commenced with 2 c.c. of prepared pus injected hypodermically in the neck—near-side one week, off-side next week. Each week an injection was given, increasing the dose by 1 c.c. each time.

Group No. 3.—In this case treatment was commenced by giving 1 c.c. or 2 c.c. Preisz-Nocard vaccine hypodermically, and increasing the dose by ½ c.c. or 1 c.c. as thought necessary. One injection was given each week. Polyvalent vaccine was given when thought necessary in doses of 2 or more c.c.

It is certainly not fair to deduce final conclusions at the present stage of these tests, but the following may be submitted as tentative conclusions based on the progress made up to the present :—

(*a*) No form of treatment in advanced cases with multiple lesions seems to be of any avail.

(*b*) From the above it follows that cases of ulcerative lymphangitis should be submitted to treatment by antibodies in the initial stages of the disease.

(*c*) From the results of the comparative treatments up to the present, that by prepared vaccine seems to be the most effective in, mild uncomplicated cases, as progress is more rapid.

(*d*) The results of the other two groups were about equal, and no very definite conclusion as to their relative merits can be submitted as a result of this experiment. Certain it is, however, that in this particular instance progress was more slow than in the case of the group treated by prepared pus.

SUMMARY OF CASES DESTROYED.

Number of cases sent without any treatment at all a few days after being admitted to hospital	105
Number of cases sent after treatment by other means than vaccine	16
Number of cases sent after treatment by Preisz-Nocard vaccine	87
Number of cases sent after treatment by prepared pus ..	21
Total	229

Many of the cases destroyed after treatment by vaccine were put down a few days after arrival at this hospital, having been treated by the vaccine before arriving here. It is, therefore, submitted that a more uniform standard of condemnation should be aimed at.

February 27th, 1918.—In continuation of the previous report, I am now able to submit the final results of the comparative methods of treatment therein referred to.

Group No. 1.—*Serum and Preisz-Nocard Vaccine.*	
Cured	17
Destroyed	3
Group No. 2.—*Pus Vaccine.*	
Cured	14
Destroyed	6
Group No. 3.—*Preisz-Nocard Vaccine.*	
Cured	15
Destroyed	5

The conclusions which may now be deduced from these groups, comprising comparative methods of treatment as well as from observations of a large number of cases treated, are as follow:—

1. *Treatment by Pus Vaccine.*—Very successful and rapid in action in mild, uncomplicated cases. In moderate and advanced cases it does not, however, meet with the same measure of success. From this, one would infer that the limit up to which the stimulation of Preisz-Nocard antibodies can be carried by this means is rather a low one.

2. *Treatment by Preisz-Nocard Vaccine.*—Favourable results by this method are obtained more slowly, but with greater certainty, than with the preceding, particularly with moderate and advanced cases. Unfortunately the supply of Preisz-Nocard vaccine has not been nearly so plentiful as that of pus vaccine, and treatment by this method, on a large scale, has perforce had to be abandoned for the time being.

3. *Treatment by the combined method of Anti-Preisz-Nocard Serum and Vaccine.*—The final results of these group tests serve to demonstrate that the best results were obtained by this method. The success of this method is particularly noticeable in the more advanced cases. Progress was, however, markedly slower than with either of the other methods. Possibly this may be associated with the fact that no actively immunising bodies (vaccine) were administered until the animal had been under treatment by passively immunising agents (serum) for a period of seven days, so that practically the other methods of treatment had a week's start. One considerable drawback to this method from the practical point are the time and labour entailed in its daily application. This is particularly the case where a large number of animals is to be treated.

SCLEROSTOMES AS A CAUSE OF DEBILITY.

By Captain HAMILTON KIRK,
A.V.C. T.F.

The existence of a comparatively high percentage of cases of debility and emaciation among Army horses and mules leads me to believe that there is some sinister hidden agent at work of which we know little, or, knowing it, consider it of no consequence. Of cases occurring in France, one would perhaps be perfectly correct in assuming that they were directly caused by hard work, exposure, mud, and sometimes unavoidable irregularity in feeding and watering. These causes, however, can hardly be said to obtain at home, and yet we know that debility cases still occur, and in considerable numbers. Having no access to any statistics on the subject, but relying merely on my observations in veterinary hospitals and units in the field, I know that the mortality among horses during the war, due primarily to debility, must have been colossal. Some argue that the majority of such horses do not die actually of debility, but of some complication such as pneumonia. To this I would answer that the pneumobacillus would never have got a firm hold had it not been for the animal's previous lowered vitality. In the case of mange patients, the opinion is often advanced that mange is the cause of the emaciation, and in reply I would ask: "Is it not conceivable that a horse already having become poor falls a readier prey to mange?" The stereotyped teaching I know is to the effect that acariasis is directly the cause of a loss of condition, and while agreeing with this, I also hold that the reverse may be equally true. Supposing then that my view is correct, and that emaciation is the primary disease which is so readily followed by more serious complications, and frequently death, what is the cause of the emaciation? I consider it is verminous infection of the alimentary canal, and in advancing this view I make no claim to originality, for as far back as 1916 I remember a letter which was circulated to A.V.C. officers to the effect that all *post-mortems* held on animals which had died or had been destroyed for debility were to be conducted with a view to finding the ætiology, and that particular care was to be exercised in the search for intestinal or gastric ulcers. In consequence I have paid greater attention to the subject, and in some cases have discovered small petechiæ or ulcers, or both, and usually associated with the presence of sclerostomes. In practically every case in which I have found sclerostomes on *post-mortem* in the fæces, or attached to the mucus membrane, the horses have in life been "bad doers," or they were positive debility cases. Some veterinary officers have expressed it as their opinion that these worms do no appreciable damage, but I am quite convinced they do. Just before I left France, a certain light draught horse died in the early hours one morning, having been up the line with rations the previous night. By the time I arrived to make my autopsy, the veterinary sergeant had removed the skin and made an incision down the median line of the abdomen. Upon exposing the viscera, a perforation of the large colon could at once be seen, which the Transport Officer mistook for a bullet wound. In the absence of any hole in the skin or muscles, however, this was negatived, and I had the bowels removed, this disclosing two other perforations, one in the large and one in the small intestine. Round each of these holes was a black ring of inflamed and necrosed tissue, measuring roughly 1½ inches across, and prior to the perforation these centres had without doubt been ulcers. I searched for their cause, but could find nothing except hundreds of sclerostomes, which may, or may not, have been the origin of the trouble. I was strongly suspicious, however, and finally concluded that it was the inflammation set up by these parasites which caused the ulcers, and ultimately perforation, peritonitis, and death. The ascertained history of this horse was to the effect that no untoward symptom of any kind had been noticed prior to death, with the sole exception that he was a "bad doer." In a veterinary hospital in France I many times found these parasites in the alimentary tracts of dead debility horses, though at that time I had not thought so seriously of it as I do now.

Just recently I have passed a period of temporary duty at a mange hospital in the Aldershot Command, and at the time I was there perhaps 80 per cent. of the cases were also debilitated. Many were extremely thin, and on a particular occasion an 8-year-old mule got down, and owing to excessive weakness and partial paralysis of the hind quarters was ultimately destroyed. I made a *post-mortem* and discovered four distinct types of worm: (1) Filaria Papillosa (5 inches long), which is uncommonly met with free in the intestine; (2) Sclerostomum Equinum; (3) S. Tetracanthum; and (4) a small un-named grub-like parasite about ⅓ inch long. The sclerostomes were everywhere in abundance, and in this particular case were nearly all copulating, and found attached to each other at the caudal extremity. At another veterinary hospital where there had been many deaths which upon *post-mortem* had been recorded as due to "parasitic enteritis, accompanied by marasmus," the presence of sclerostomes was everywhere manifest, and no *post-mortem* held upon any animal which had suffered from debility and emaciation could fail to reveal them either in scores or in tens of thousands. In a great many cases aneurisms of the mesenteric and colic arteries were found, in various stages of development, and always containing several sclerostomes. One aneurism, which had been preserved, had assumed the size and shape of a sheep's heart, and in a rare instance I knew of one attaining the size of a horse's heart. Small ones, however, were very common, and undoubtedly gave rise to many of the cases of colic with which we were troubled, and which prior to *post-mortem* could not be accounted for. Some outstanding symptoms may be noted in horses affected with sclerostomiasis, and these are: Arching of the back and loins; capacious appetite; signs of paraplegia, or perhaps only stiffness of the hind legs; varying stages of emaciation from slight to extreme; occasionally a rise in temperature up to about 103°, and sometimes (but in my experience only rarely) constipation alternating with diarrhœa. In cases where these parasites have set up an aneurism complicated by the formation of one or more emboli, there will be frequent attacks of colic, each usually of short duration.

Yesterday I held a *post-mortem* on a horse which had shown all these symptoms, and the large colon presented a sight which, had it been described to me without visual confirmation, I would never have believed. The ingesta within it was a writhing mass of sclerostomes, and in some places there were solid conglomerations of the size of an orange, entirely composed of these worms. An egg-sized aneurism was also present in the great mesenteric artery, and it needs no second thought to realise that the presence of the aneurism and its clot in this situation reduces the calibre of the above artery, and so diminishes the supply of blood to the intestine, which is sufficient to explain the chronic indigestion observed. It is, therefore, conclusively proved that these sclerostomes are the cause of great havoc and loss among equines, and deserve the closest investigation both as to their origin and the means of eradication. I have tried many of the most favoured anthelmintics, but cannot claim as yet to have discovered any reliable cure.

PYÆMIA IN A HEIFER.

By G. MAYALL, M.R.C.V.S.

WAS called to a heifer on March 11th that had had a rough time at calving three days previously, and was now straining repeatedly, but not continuously. The subject had cleansed, but on opening the lips of the vulva and examining the vagina I found it to be torn on each side about 4 inches in, and pieces of necrotic tissue lodged in the wounds. Cleansed the areas well with creolin solution, and, using a mercuric chloride bougie as a caustic stick, inserted it well into the depths of the wounds on each side and dusted the vagina with plasmul powder. Left mercuric iodide solution to inject in the wounds, and also the bougie, and gave the cow a draught of 1 ounce of elixir Kugloid co. (beechwood creosote, quinine, eucalyptol, syr. glyco. phosph. co.) in a pint of water. Five doses of the elixir were left, and the farmer was instructed to insert the bougie into the wounds and inject and dress them twice daily. On March 13 the wounds in shape were looking better, and healing, but heifer had a dry muzzle, a temperature of 103, and was not eating or drinking well, and still straining occasionally, which I attributed to the soreness and irritation in the vagina.

On March 18th an abscess formed just above the off stifle, which I lanced and let out about ¼ pint of creamy pus, and injected with a solution of iodophenate of mercury and zinc (eophan tablets, Willows and Co.), and also the wounds in the vagina. Left another course of the elixir Kugloid, as I was anxious to avoid further pus formation. Heifer seemed better in herself, did not strain much, and was eating and drinking a little. Ordered regular and thorough injection of lesions with the mercury and zinc solution.

On March 25th the abscess cavity and wounds were doing well, and the animal had been out on a grass field during the sunny hours of the day. I left some more internal antiseptic medicine.

On March 30th another abscess formed on the outside of the right lip of the vulva. I lanced and injected it and on April 5 the heifer was going out regularly when fine and seemed in a fair way to complete recovery.

I am recording this case because pyæmia is not now of very frequent occurrence in our patients, and most authorities agree that it is generally fatal when it occurs. Complete and methodical disinfection seems to give the only hope for favourable results, and at the same time a good intestinal and general antiseptic is advisable. Merillat in his "Principles of Veterinary Surgery," Vol. II, gives Bouley's view that the following is the order of frequency of pyæmia in the domestic species:—(1) fowl, (2) oxen, (3) dogs, (4) swine, (5) sheep, (6) rabbits, (7) horses.

BRAXY: WITH SPECIAL REFERENCE TO THE DISEASE AS SEEN IN NORTH CARDIGANSHIRE.

By E. MORGAN, M.R.C.V.S., D.V.H.

(*Concluded from May issue.*)

We have even succeeded, by this means, in saving all our best wether lambs. We fed them for three successive seasons with maize and swedes, on fields where braxy used to be rife. During the entire period, only one lamb suffered from braxy, and this was found to be in the first stages of the disease, as he had taken some food a few hours before. We killed the lamb and he bled moderately well, though the blood from an animal suffering from braxy does not spurt out, but runs in a slow, continuous stream, as if from a vein. In this case we found the skin and flesh as the "Book of Husbandry" said: "Far ruddier like blud, more than other skin should be," proving how quickly the disease runs through the system, as evidently the lamb could not have been feeling much pain as he was able to take food only four hours previously.

Why the best conditioned lambs suffer more than those in a poor condition is difficult to account for satisfactorily; maybe the plethoric state of the animal has something to do with it. According to McCann, it is definitely known that the specific gravity of the blood can be changed at will through the instrumentality of diet, and that, furthermore, minerally deficient food affects, with extraordinary rapidity, the specific gravity of all the internal secretions. Normally fed animals in whose diet appear the salts and colloids of calcium, potassium, iron, phosphorus, manganese, magnesium, sodium, sulphur, silicon, chlorine, fluorine, and iodine, are able to develop immunity to many diseases. We are quite certain that all forms of malignant diseases are only possible in the absence of, or loss of, immunity. The extent to which natural immunity depends upon the specific gravity of the blood has never been sufficiently realised.

Meadowland with abundance of moss should be avoided, as feeding lambs on moss is something like those people who used to destroy their neighbours' dogs by means of a piece of sponge soaked in dripping, or hot liquid fat, either of which contracts the sponge ; when this enters the stomach and the fat is absorbed into the system the sponge expands—the result being obvious.

Braxy is more prevalent on land low down in the valley, and land bordering on marshes, than on dry tableland up the hill, and it is an interesting fact that old sheep always direct their footsteps towards the highest point of the farm at evenfall, and they are still more eager to do so should the land below be marshy or wet.

There is a vast difference between the temperature in winter down in the lower ground and that higher up the hill, cold air naturally falling, while hot air rises, as instanced by the fact that hoar frost lasts longer down in the glen than higher up on the hill. Again, no one would place outlet ventilators for hot air on the floor of a building ! When sheep are seen making for the higher ground they are, as a rule, in good health ; but if they stay down in the valley overnight without showing inclination to move upwards to rest, a lack of vitality is indicated. This is one reason why it is advantageous to allow the lambs to follow the ewes ; the old sheep know better, and are therefore able to train the young. The farmers on the high hills—where the bulk of the flock has to face heavy snowstorms, with hardly any shelter whatever, except an odd rock here and there—keep their wethers until they are about four years old. One reason, amongst others, given for doing so, is that they act as guides to the rest of the flock. During the heavy snowstorms (which generally appear one winter in every six) they lead them out in search of food, and not only lead them out, but actually scrape up the snow until they reach the tips of a few rushes or some heather. Were it not for this intelligent help, the younger flock would probably starve to death down in the valley. Homer compares Ulysses drawing his men to a ram ordering his flock —

> From rank to rank he moves and orders all ;
> A stately ram thus measures o'er the ground
> And, master of the flock, surveys them round."

(POPE'S TRANSLATION.)

Shelter at Night as a Preventive of Braxy.—Where braxy occurs, it is advantageous to give lambs shelter. The open air is preferable to housing, as the lambs will feel the bitter cold upon being turned out of a warm building in the morning. In Germany, where they always house the sheep at night, it is said that the percentage of deaths is very high from a disease they call braxy. I am rather doubtful as to whether this is identical with the beaxy of Scotland and Wales, because old sheep as well as young ones suffer from it. But whatever the disease, it probably accounts to a great extent for the rapid decrease in the number of sheep in Germany between 1892 and 1913, when the numbers fell from 13,600,000 to 5,500,000, i.e., a decrease of 60 per cent. in twenty-one years. In Great Britain a decline is also observable between the years 1909 and 1913, the number of sheep decreasing from 31,840,000 to more or less 28,000,000. This decline is unsatisfactory, but it appears trivial when compared with that of Germany, more especially when we remember that the United Kingdom has been for many years the breeding ground for pure-bred sheep.

In Montgomeryshire, anyone interested in sheep may see the nearest approach to perfection of any country in the matter of management and breeding to type. They appear to have been gifted almost like the patriarch Jacob in successfully mating their sheep so that the progeny will have the desired markings on the face, either "ring-straked," "speckled" or "spotted." In certain braxy areas they provide autumn shelter for the lambs along hedgerows, etc. They also place galvanised iron sheets with ferns or straw above and below them, wherever the lambs are accustomed to rest at night.

A few years ago we had a flock of wether lambs grazing on some fields where we always lost a great number from braxy. These lambs were in extra good condition that particular season, as they were intended from the first for the butcher. They acquired a habit of going every evening to rest in an adjoining plantation where spruce, larch, and other trees were in abundance and under the spreading branches of which they sheltered. But one night, being disturbed by dogs, they spent the remainder of it on some marshy land near by, where we found them next morning. One of their number was dead—the only one of the lot which died that season. I could give several more instances to prove that shelter is advantageous for lambs. The ancients were most careful in providing night shelter for their flocks. Polyphemus is represented by Homer as driving his flocks at eve to his rude cote—a rocky cave. Virgil, lib. XI., describes the cote as designed to "fend" the bitter cold and prevent the diseases produced by it :—

"Frost with assiduous care from winter keep,
Well foddered in the stalls the tender sheep;
Then spread with straw the bedding of thy fold,
With fern beneath to fend the bitter cold,
That free from gout thou may'st preserve thy care,
And clear from scabs produced by *freezing* air."

DRYDEN.

There are certain farmers in Montgomeryshire who believe that gentle exercise in the early morning is a preventive of braxy, and so they travel their lambs along the road for a few miles every morning. I state this in order to show what pains they take in that country to keep their flocks in good health.

The Pig-dung Treatment as a Preventive.—This is one of the oldest and most universal preventives. In case someone of new experience would care to give it a trial, the method is as follows:—"Feed one or more pigs—store pigs for preference—on pasture where braxy was prevalent the previous season; give them, as well, skimmed milk *ad lib.* After they have fed here for three or four days, collect the dung. One pound is ample for thirty lambs. Mix it well in two quarts of fresh milk; strain the extract through a cheese cloth and squeeze it well, so as to secure all the liquid. Divide this proportionately between thirty lambs, after having starved the lambs for at least twelve hours previously. Drench them again in the early morning, and keep them in for two hours after doing so. This should be done about the middle of September, before the braxy season commences. Turpentine is also held by many farmers to be a good remedy. Either administer half a teaspoonful mixed with a little milk, or oil, and drench, or apply a small quantity externally over the loins, above the kidney. Remember, though, that the latter treatment causes the animal a good deal of pain for a while. Bleeding by cutting the tips of the tails in November is practised by some.

As I am unable, as I intended, to go into details with regard to either the symptoms of the disease or the bacteriological side, I must content myself with only mentioning a few points.

Symptoms.—The lamb moves uneasily about the field and lies down; then gets up suddenly. He may do this amongst the rest of the flock, but later on he withdraws himself to a quiet corner of the field, and although he does not seem to be so uneasy, yet the pain increases, as one can easily tell by the expression of the eyes, etc. He is now undoubtedly in a high state of fever, and the internal pains, together with the fever, are rapidly intoxicating the system. The temperature, as a rule, is about 107° F. There may be a discharge of froth or saliva, and this is seen hanging from the mouth, and sometimes before death it may even be tinged with blood; often, too, there is a distention of the abdomen during this last stage. Eventually the lamb turns on one side and expires. This succession of symptoms lasts from six, and sometimes up to twelve, hours.

Post-Mortem.—As a result of the large quantity of gas which has been formed, the carcase soon swells up. There is a discharge of blood-coloured froth from the mouth and nostrils; the legs are stretched well apart, owing to the distention of the body by gases, and the least pressure sometimes causes these gases to burst through the abdominal wall. Here one should remember an advice:—" To thine own nose be true, and it must follow, as the night the day, thou canst not then be false to inner man." It is said that the sense of smell deteriorates as civilisation advances. We hardly ever make use of this organ in order to describe a disease—at any rate, we do not make the use we should do. Kipling declares that the most vivid and lasting memories the world traveller brings back with him are the characteristic smells of the different countries visited, such as " Camel, pure camel, one whiff of which is all Arabia," and " Them spicy garlic smells " of Mandalay; while Sir Ernest Shackleton supports him and says: " China conjures up in my mind the smell of moth-eaten centuries." Once one gets a whiff of a braxy carcase, the characteristic odour—difficult to describe—is unforgettable. Professor Hamilton once said: " Could you imagine an odour composed of sour beer, stale fish, and decomposing urine, the compound would give you some idea of what braxy odour is like!" But to return to what we find on making a post mortem. There are several hæmorrhages in various parts of the body, such as the fourth stomach and surface of the heart; the lungs are congested; the liver and kidneys are soft and pliable; the abdomen contains a large quantity of blood-stained serous fluid, hence the name "red-water." Furthermore, the veins (especially the subcutaneous ones) are distended with dark-coloured blood; the skin is reddish in colour, still retaining this hue even when dried up. Finally, putrefaction soon sets in.

Bacteriology.—A rod-shaped bacillus, discovered by Ivar Nielsen, a Norwegian, has been put down, until recently, as the causal organism of braxy; Professor Hamilton and others also concurred in this opinion. This bacillus is known as " Bacillus Gastromycosis ovis," and the organisms are discovered in abundance in the internal organs and in the peritoneal fluid. If the carcase has only been dead for a few hours, myriads of these will be found in all its tissues. It belongs to the class of putrefactive organisms, and undoubtedly this *is* a putrefactive organism.

Dr. McGowan, of Edinburgh, has discovered another class of organisms which he calls the "Bacillus bipolaris septicus oviam"; this he found at first in the lungs. He claims that this organism is *the* causal organism of braxy, and that that described by the Braxy Committee is of a putrefactive nature, and has been superadded to the essential causal factor of the disease. He further states that the lung in which this hæmorrhagic septicæmia organism occurs in largest amount has not been subjected to investigation by them. He claims that this organism is the primary causal, and that hoar-frost, rank grass, etc., are secondary causes which lower the vitality of the animal and allow the bacillus bipolaris septicus to gain an entrance to its tissue. He has cultivated this organism, inoculated sheep from the culture, and caused the same disease. One animal died in about eight hours, another in about fifteen hours, and a third in less than forty-eight hours. This is a most interesting and important point and goes far to prove that Dr. McGowan has strong claims for this being the causal organism. It reminds me of the lamb which took its feed in the morning and which four hours or so later I found far advanced with the disease. Besides this case, I have mentioned others where the lambs were apparently quite well late in the evening, and yet were found to be dead early the next morning, some of them being actually stiff and hard. It is interesting to note that Professor Hamilton gave the incubation period of the organism upon which he was working—Neilsen's organism—as between forty-eight and sixty hours. These investigations make us hope of seeing a vaccine prepared from the causal organism, so that we can protect the lambs during the dangerous period against the disease.

"So let us not think, but try."

Acknowledgments.—I am indebted to Professor Beattie, of Liverpool University, for valuable information regarding this disease, and to Dr. McGowan, of Edinburgh. My thanks are also due to Mr. Jenkin Lloyd, of Pant, Tregaron, for valuable information.

PTOMAINE POISONING IN THE DOG.

BY G. MAYALL, M.R.C.V.S.

AN Airedale dog scratched up and devoured part of the offal of a bullock that had carelessly been thrown over a hedge by a gardener and partially dug into the earth. In a few hours he was violently sick, and a little later on diarrhœa set in and was very persistent. When I saw him he seemed fairly strong on his legs and able to get about, but had been vomiting and was evidently suffering from diarrhœa. I prescribed elixir Kugloid co. in drachm doses; also I ordered dry food and limited liquid to ½ pint a day. On visiting the dog six days later he was still suffering from diarrhœa, and had vomited three times since I saw him previously. I prescribed a mixture of bismuth and salol, and teaspoonful doses of sac. lact. dry on the tongue night and morning. I also advised the giving of ten or a dozen arrowroot biscuits daily.

Five days later the dog had improved, but the diarrhœa had not entirely ceased. I prescribed a mixture of bismuth, bicarbonate of soda and chlorodyne, and he seems now on the high road to complete recovery. I have never known diarrhœa to persist so long in the dog without producing absolute prostration, which did not occur in this case.

TOXIC ENTERITIS AND CONSTIPATION IN THE DOG.

By HENRY B. EVE, M.R.C.V.S.,
Folkestone.

Subject.—Fox-terrier (property of a rat-catcher, a very cunning know-all dog doctor and dealer), age about five years, a sportsman and well-known fighter with other dogs.

History.—Dog noticed to vomit continually and pass pultaceous, blood-tinged fæces. Owner had given him a pill of calomel and opium, which had not worked, so gave castor oil and buckthorn, which only produced blood-stained fæces, and he thought the dog would die, which seemed probable.

Symptoms.—Subject seemed very dull, listless; conjunctiva injected; pulse weak, and temperature 104° F.; lay about disconsolate, and refused all food. The breath was very offensive owing to the fœtid condition of the mouth, which was infested with tartar. Great thirst present.

Treatment.—Injected up the rectum, sodium chloride pure (tablet) 15¾ grs. (Parke, Davis and Co.) dissolved in four imperial fluid ounces of water, which the animal held for about ten minutes or so (owner held his hind legs up, and allowed his fore-feet on the ground), when the dog vomited greenish slime and débris, I guess, derived from dustbins, judging by the stink. I then waited about ½ hour and re-injected (Na.cl.), which was followed by clear vomit and no smell. The dog seemed very weak, so I gave him hypo.inj., ether and brandy, as I feared collapse. I sprayed the mouth, etc., with hydrogen-peroxide. I gave owner some pure-medicinal liquid paraffin to take home and give a teaspoonful ere he went to sleep, which was kept down.

Diet.—Nutrient suppositories only for 24 hours. Next day I saw it; patient very weak and prostrate, temperature down to 101° F., but brighter. Continued paraffin treatment. I gave Brand's essence, and glasco by the mouth, which it drank readily, being very thirsty. Next day dog passed soft fæces, no blood, and voluntarily took food (fluid nourishment only allowed).

Result.—The dog recovered in about 10 days, to the owner's delight, and is as game as ever. I am still giving occasional doses of paraffin to regulate the bowels, and have restricted his diet to semi-solid food.

Remarks.—I have had cases in Yorkshires, Aberdeens and Airedales, and have found this treatment give the best results up to date with no casualties. I intend to continue it, as it is inexpensive from a drug point of view, and preferable to other medicines I have tried—often with fatal results. This treatment I adopted from seeing the article by Mr. G. Mayall, M.R.C.V.S., in VETERINARY JOURNAL, some time ago. I am very grateful to him for publishing his treatment of such cases, as now they are no bugbear at all; in fact I welcome them, and will record future results.

P.S.—I have found liquid paraffin in milk excellent for cattle coughing, when suspecting incipient tuberculosis.

ORAL SEPSIS IN THE DOG.

BY HENRY B. EVE, M.R.C.V.S.,

Folkestone.

Notes on Cases.—Fœtid breath or oral sepsis is in my opinion undoubtedly bacterial in origin, and usually accompanied by a general or systemic disturbance or a local irritation. Saliva is not apparently a bactericide. When due to local causes such as Pyorrhoea, septic alveolitis or periostitis, impaction of deciduous teeth, loosened teeth or foreign bodies, it ceases as soon as the cause is removed by extraction, even without any ante or post operative treatment. When simply due to the accumulation of debris of food, cleaning with a tooth brush containing a little antiseptic tooth powder or mouth wash generally will do away with the smell. The worst cases I have met with of "oral sepsis or gangrenous stomatitis," I find, are generally seasonal complaints and often occur in an epizootic form in the dog and cat. In its epizootic form it is apparently always a clinical form of distemper or canine typhus (Stuttgart disease) and very fatal and difficult to treat, as sooner or later symptoms of "acute specific gastro-enteritis" develop, and the dog dies, or if it recovers the condition of sepsis disappears when the animal regains its general health.

Prevention, Treatment and Diet.—Oral sepsis or other septic mouth trouble can be prevented in a great measure by dog owners giving suitable food; tearing raw meat from bones, I suggest, is the best, it being a carnivorous animal, and not soft, pappy starchy food, or dog biscuit mealies, which are a frequent cause of eczema.

Medicinal.—If tartar present, I clean the teeth with a little powdered pumice-stone, and then spray the gums, mouth, etc., with hydrogen-peroxide, which will bleach the teeth, and if any smell, I use a preparation of Eau-de-Cologne, myrrh, benzoin and boric acid, Peru balsam in emulsion. Internally, I have found pepsine and hydrochloric acid given in the food very good as a tonic. If intestinal complication is present, I have had fairly good results with capsules of beta-napthol and salol, which appears to disinfect the whole of the intestinal tract. Also nutrient suppositories and ice to such, or in pills put down the throat, and diffusive stimulants if necessary to prevent syncope.

Remarks.—In cases I have made a post mortem on, I have generally found structural disease of the kidney, stomach and intestines, accompanied by bacterial necrosis of liver, which seems to be the basis of the trouble. I have not seen ulcerative stomatitis in absolutely toothless dogs as yet.

PARASITISM. A RÉSUMÉ.

By FRED. C. MAHON, M.R.C.V.S.,
Chiswick, W.

> "Read not to contradict and confute, nor to believe and take for granted, nor to find talk and discourse, but to weigh and consider."—*Bacon.*

As many contributors to the Veterinary Periodicals, at one time or another, furnish their emanations with a text, I deem it worthy of the occasion to quote Bacon, and trust the rules he inculcated will be applied to myself on this occasion.

I have selected a study of Parasitism, and my essay embraces the condensed information extant, so far as I have gone. The subject is one of great importance from a national as well as a scientific point of view. Slowly but surely neglected subjects, relegated to a musty corner, assume under varying conditions a phase for serious consideration and of especial significance. The future calling of the Veterinarian, the meat inspector, the medical practitioner, alone and in conjunction with the veterinarian, will doubtless be wrapped up in a study of Parasitism.

I.—NATURAL PROTECTION AGAINST PARASITISM.

The living organism is a rich storehouse of the very materials from which parasites, both animal and vegetable, can best derive their nourishment. Some means is necessary, therefore, to protect the one from the encroachments of the other.

A plant or animal in perfect health is more resistant to parasitical invasions than one which is ill-nourished and weakly. Of a number of plants growing side by side, those which become infected with moulds are the most weakly, and an animal in low health is more subject to contagious disease than one which is robust. Each organism possesses within itself the means of protection against its parasitical enemies, and these properties are more in evidence when the organism is in perfect health than when it is debilitated.

One chief means employed by Nature in accomplishing this object is the investment of those parts of the organism likely to be attacked with an armour-like covering of epidermis, periderm, bark, etc.

The grape is proof against the inroads of the yeast plant so long as the husk is intact, but on the husk being injured, the yeast plant finds its way into the interior, and sets up vinous fermentation of the sugar.

The larch remains free from parasitism so long as its covering is intact, but as soon as this is punctured by insects, or its continuity interfered with by cracks or fissures, the Peziza penetrates, and before long the destruction of the branch begins to be accomplished.

So long also as the epidermis of animals remains sound, disease germs may come in contact with it almost with impunity, but immediately on its being fissured or a larger wound made through it the underlying parts, the blood, and soft tissues are attacked by them.

A very remarkable instance of an acquired means of protecting a wound against parasitic invasion is to be found in granulations. Should these remain broken, they constitute a natural barrier to the penetration of most pathogenic, and other forms of germ-life, into the parts beneath. Bacteria of various kinds which alight upon their surfaces begin to fructify in abundance, but are rapidly destroyed, as they burrow deeply. This is accomplished by a two-fold agency for (1) while numbers of them are seized upon by the granulation phagocytes, others are broken up and dissolved by the liquid filling the granulation interspaces (Afanasieff). (2) The latter or histolytic property is not confined to the liquid of granulations; normal blood-serum possesses it to a certain extent. Jürgelünas makes out that when an animal is rendered immune to a particular micro-organism this histolytic property becomes exalted.

II.—EFFECT OF PARASITISM ON HOSTS.

The intensity of the effect of Parasitism on the hosts of the parasite ranges from the slightest local injury to complete destruction. All animals and plants harbour a number of parasites; the range of the direct effect of parasites is seen to be greater. It is probable that in a majority of cases the tissues of animals and plants resist the entrance of microbes, unless there is some abrasion or wound.

In the case of plants, the actual local damage caused by animal or vegetable ectoparasites may be insignificant, but the wounds afford a ready entrance to the spores or hyphæ of destructive endoparasites. So also in the case of animals it is probable that few microbes can enter the skin or penetrate the walls of the alimentary canal, if these be undamaged.

But as knowledge advances the indirect effect of parasites is seen to be of more and more importance. Through the wounds caused by biting insects the microbes of various skin diseases and inflammations may gain entrance subsequently, or insects may themselves be the carriers of dangerous endoparasites, as in the case of mosquitoes and malaria, fleas and plague, tsetse-fly and sleeping-sickness.

Similarly the wounds caused by small internal worms may be in themselves trifling, but afford a means of entrance for microbes. It has been shown for instance that there is an association between appendicitis and the presence of small Nematodes. The latter wound the cæcum, and allow the microbes to set up the subsequent inflammation to reach their nidus. It has been suggested that the presence of similar wounding parasites precedes tuberculous infection of the gut.

The parasites may cause direct mechanical injury, which is greatly aggravated where active production takes place on, or in, the host, with larval migrations. A tangled mass of ascarid worms may occlude the gut. Masses of eggs, larvæ, or adults may block the blood-vessels, or cause pressure on important nerves. The irritation caused by the microbes or the secretions of the parasites may set up a reaction in the tissues of the host leading to abnormal growths (*e.g.* galls and pearls) or hypertrophies.

Migration of the parasites or larvae may cause serious or fatal damage. The abstraction of food substances from the tissues of the host may be insignificant even if the parasites are numerous, but it is notable that, in many cases, the effect is not merely that of causing an extra drain on the food supply of the hosts which might be met by increased appetite. The action is purely selective: particular substances, as glycogenare, absorbed in quantities, or particular organs are especially attacked, with a consequent overthrow of the metabolic balance.

Serious anæmia, out of all proportion to the mass of parasites present, is frequently produced, and the hosts become weak and fail to thrive. Finally, the attacks of parasites have led to the development by the hosts of a great series of protective mechanisms. Such adaptations range from the presence of thickened cuticle, with hairs or spines, the discharge of waxy, sticky, or slimy secretions, to the most elaborate relations of the tissues of the host to the toxins liberated by the parasites.

A. Giard has worked out the special case which he designated as "Parasitic Castration" and shown to be frequent amongst animal hosts. Sometimes by direct attack on the principal sexual organs and sometimes by secondary disturbances of metabolism, the presence of the parasites retards or inhibits sexual maturity, with the result that the secondary sexual characters fail to appear. The more usual and serious effect on the hosts of parasites is, however, due to the toxins liberated by them.

III. EFFECT OF PARASITISM ON PARASITES.

The phenomena of Parasitism occur so generally in the animal and vegetable kingdoms, and are repeated in degrees so varying, that no categorical statements can be laid down as to the effects produced on the organisms concerned.

All living creatures have a certain degree of correspondence with the conditions of their environment, and Parasitism is only a special case of such adaptation. The widest generalisation that can be made regarding it is that Parasitism tends towards a rigid adaptation to a relatively limited and stable environment, whilst free life tends towards a looser correspondence with a more varying environment. The *summum bonum* of a parasite is to reach and maintain existence in the limited conditions afforded by its host. The goal of the free-living organism is a varying or experimental fitness for varying surrounding conditions. And if the metaphor is continued, the danger of Parasitism for the parasite, is that it it becomes too nicely adjusted to the special conditions of its host, and fails to attain these, it will invariably perish.

The degeneration of parasites is merely a more precise adaptation; in the favourable environment, the degenerate or specialised parasite is best equipped for successful existence, but the smallest change of environment is fatal. Such a generalisation as has been formulated covers nearly all the peculiarities of Parasitism. Organs of prehension are notably developed; parasitic plants have twisting stems, boring, roots and special clinging organs; parasitic animals display hooks, suckers, and boring apparatus.

The normal organs of locomotion tend to disappear, whether these be wings or walking legs. Organs of sense, the chief purpose of which is to make animals react quickly to changes in the environment, become degenerate in proportion to the changes which the parasite may have to encounter and are diminished. The changes correlated with nutrition equally conform with the generalisation. The animal has no longer to seek its food, and the lithe segmentation of a body adapted for locomotion becomes replaced by a squat or insinuating form.

Jaws give place to suckers and piercing tubes; the alimentary canal becomes simplified, or may disappear altogether, the parasite living on the juices of its host, and absorbing them through the skin. So also parasites obtaining protection from the tissues of their host lose heir instinctive protective properties.

Reproduction.—The reproduction of parasites offers many peculiarities, all of which are readily correlated with our generalisation. A creature rigidly adapted to a special environment fails if it does not reach that environment, and hence species most successful in reproduction are able to afford the largest number of misses to secure a few hits, and so maintain existence. High reproductive capacity is still more urgent when the parasites tend to bring to an end their own environment by killing their hosts.

The reproductive processes of animal parasites are equally exuberant, as in the case of fungi. In the first place hermaphroditism is very common, and the animals in many cases are capable of self-fertilisation. Pathogenic reproduction and various forms of vegetative budding are found in all stages of the history of animal parasites.

The prolificacy of many parasites is almost incredible. As Leuckart pointed out, a human tapeworm has an average life of two years, and produces in that time 1,500 proglottides, each containing between 50 and 60 thousand eggs, so that the single tapeworm has over 80,000,000 chances of successfully reproducing its kind.

The devices tor nourishing and protecting the eggs and embryos are numerous and elaborate, and many complex cases of larval-migration and complicated cases of heteroecism occur.

The physiological adaptations of parasites are notable, especially in cases where the hosts are warm-blooded. The parasites tend to become so specialised as to be peculiar to particular hosts. Ectoparasites frequently differ from species to species of host, and the flea of one mammal, for instance, may rapidly die if transferred to another although similar host.

The larval and adult stages of endoparasites becomes similarly specialised, and although there are many cases in which the parasites that excite disease in one kind of animal are able to infect animals of different species, the general tendency is in the direction of absolute limitation of one parasite, and indeed one stage of one parasite, to one kind of host. The series of events seems to be a gradual progression from temporary or occasional parasitism to obligatory parasitism, and to a further restriction of the obligatory parasite to a particular kind of host.

The worthy studies and clinical cases recorded by that zealous practitioner Noel Pillers, F.R.C.V.S., of Liverpool, are worthy of due note. He grasps the importance of a study of what to the many requires patience and perseverance. To the scientist one potent fact is elicited by such recorded cases, that they are handed down to posterity as a legacy worthy of note, and give to their author

the distinction "of something attempted, something done.'' The study of Parasitism has always had a fascination for me, and research in connection with it is destined to play a great part in the future advance of medical science.

LITERATURE.

T. S. Cobbold (Entozoa: an Introduction to the Study of Helmintholog (1869). R. Leuckart (The Parasites of Man: Eng. trans. 1886).

Of more modern books: Ed. of L. G. Neumann's "Parasites and Parasitic Diseases of the Domesticated Animals." (By late Dr. Geo. Fleming, C.B.) Revised by Professor J. Macqueen, F.R.C.V.S., London.)

"Animals," and the English Ed. of Max Braun's "Animal Parasites of Man," are the most comprehensive.

Translations.

COCCIDIA IN THE INTESTINES—RED DYSENTERY OF CATTLE—OBSERVATIONS ON EIMERIA ZURNI-RIVOLTA.

BY PROFESSOR B. GALLI-VALERIO.

Of the Institute of Hygiene and Parasitology of the University of Lausanne.

In 1878 Zürn noted for the first time the presence of coccidia in the intestines and glands of a calf which died of acute intestinal inflammation, and the same year Rivolta considered these quite distinct from the coccidia of the rabbit, and gave them the name of Cystospermium zürni. Since this period this coccidium has been the subject of frequent investigations and notices, for it has acquired great prominence as the cause of a grave malady of cattle known under the names of hæmorrhagic enteritis, bloody flux, red diarrhœa, coccidian diarrhœa, enteritis coccidiosa bovis, dysenteria, coccidiosa bovum. As this affection, as I have seen it, presents all the characters of bacterian and amœbian dysentery of man it ought to be named *coccidian dysentery of cattle.* In fact, when examining the fæcal material of infected cattle one is impressed with the fact that this is a typical dysentery; liquid fæces streaked with blood, or bloody mucus, casts coming from the anus continuously just as in the dysentery of man.

It is to the credit of E. Zschokke to have first drawn attention to, and given an exact and complete description of the symptoms, and of the pathogenic agent of this malady, and his observations have been confirmed in Switzerland by Hess, Guillebeau, and Züblin. Coccidian dysentery has been observed in a great many countries, and to-day we know that it occurs in Switzerland, Germany, Denmark, Hungary, France, Italy, England, United States, Philippines, where it has been seen in buffaloes, in North, East, and West Africa. All observers agree that the causal and specific agent of the malady is the coccidium first noted by Zürn. Guillebeau gave coccidia to three young calves to eat, and noticed fever and diarrhœa in them after three weeks.

Authors differ in opinion as to whether the coccidium of the rabbit and the ox are identical or of different species. The majority seem to take it for granted that they are identical. Degoix, Züblin, Hutyra, and Marek and Hartmann and Schilling believe that the coccidium of cattle (eimeria zurni) is distinct from that of the rabbit (eimeria stiedæ). In view of these contradictions as to the identity of the two coccidia it seems useful to review the question.

All observers who have personally studied the question agree that the causal agent presents itself in two forms—spherical and ovoid. Zürn notes this; Zschokke says that the predominant form is spherical, the greatest diameter is 10 to 20 microns; the protoplasm in the greater number of examples is homogeneous, rather refractile, and surrounded by a membrane with a double contour. Guillebeau distinguishes two forms: a large ovoid and a small spherical. Cultivating them on blotting paper at 20° to 30° C. he established the formation of four spores each with two corpuscles and the rest of protoplasm. Degoix describes them as corpuscles of 18-25×12 microns; Montgomery of 17×15 microns; Storch from 14-25×12–18 microns. Züblin says that the majority of the coccidia present a spherical form of 12–15 microns in diameter with ovoid forms of 12–10×25–30, and more rarely 20×30–35 microns. The membrane has a double contour of 1 micron in thickness. The protoplasm fills up all the capsule or is collected in a ball. He considers these different forms as microgametes, macrogametes, and fecundated forms, but in the depths he has only seen oocysts in different stages of development. Müller describes coccidia as ovoid or round bodies of 12·27 microns, with a distinct membrane of double contour. The protoplasm is composed of fine granules with a few large grains. In some forms there is a micropyle, the protoplasm filling all the cavity. These forms represent recently-fertilised macrogametes. In the other forms the protoplasm commences to contract at the periphery, and in others it is collected in a ball. These latter forms are fertilised macrogametes in a state of already advanced reproduction.

On July 15th, 1917, the author had the opportunity of observing an outbreak of coccidian dysentery in heifers on one of the Gruyère Alps, at an altitude of 1,608 m. One had been so severely attacked that it was slaughtered some days previously. Microscopic examination of liquid hæmorrhagic material from these heifers revealed the presence of innumerable coccidiæ.

In one field of the microscope 100 to 150 coccidiæ could be counted. There were two forms of these: the one very abundant and spherical, and the other ovoid and rare. After giving the structure of these the author observes that coccidiæ left in dry fæces or in water only rarely sporulated, even after two to two and a half months. On the contrary, if left in fæces kept damp and in a thin layer to allow of access of air (air being necessary to the development of coccidiæ and the eggs of helminths), or spread on filter paper placed on damp earth, the greater number sporulated in three, four, or five days.

As regards the identity of these coccidia with those of the rabbit, in the first place there are very important differences from a morphological point of view. Whilst the coccidia of cattle present mostly a spherical form, this shape is quite exceptional in coccidia of the rabbit where the ovoid form slightly flattened at one extremity is absolutely characteristic. This ovoid form is maintained even after fecundation, in such a way that the oocysts of the coccidia of rabbits have a distinctly oval form. It is quite the opposite with bovine coccidia, where ovoid forms, already rare, are completely replaced by absolutely spherical oocysts, much more analogous to the oocysts of E. falciformis than to those of E. stiedæ. A difference exists also in the form of the sporoblasts; pyriform in the case of E. stiedæ they are ovoid in coccidia of cattle. From the point of view of pathogenic action the two coccidia also differ greatly. Besides the fact that bovine coccidium, contrary to that of the rabbit, has no tendency to localise itself in the liver, it brings about a true dysentery, whilst the second only provokes diarrhœa. Another point on which Rivolta has dwelt is that the coccidiosis of rabbits is very widespread; sick rabbits or carriers of coccidia, are found in every farm and stable; bovine coccidia are relatively rare, localised in certain regions, and generally on high pasture, just where rabbits are not found. If one comes to consider the two coccidia as identical it is necessary, in this case, to think of disseminating by the hare rather than the rabbit. The hare, as I have shown (*Cent. für Bakt.*, 1908, p. 608) is frequently infected with E. stiedæ on the mountain. Experiments also controvert the identity of the two coccidia. In fact, whilst Guillebeau has been able to infect three calves with coccidia, he has never been able to infect rabbits with bovine coccidia. Moreover Züblin did not succeed in infecting rabbits. I have made an experiment on a young rabbit: I gave it large quantities of oocysts of bovine coccidia not only with the water and the food, but also introduced by a little indiarubber probang. The rabbit still lives without having shown any morbid symptoms, and without having passed any coccidia of bovine type in the fæces. All these facts are against the identity of the two forms. Coccidia of cattle have nothing to do with E. stiedæ. They constitute a species apart, which for reasons of priority ought to bear the name of *E. Zürni Rivolta*, the name of *Coccidium* (*Eimeria*) *bovis* proposed by Züblin being considered synonymous. The finding of *E. Zürni* in the fæces of cattle is easily accomplished by examination of fresh material with a magnifying power of 200 diameters. The examination of fresh material also serves well for the study of sporogony.

I have made some staining experiments which I give here. Some preparations on an object carrier dried in air, fixed with methyl alcohol and coloured sixteen hours with Böhmer's hœmatoxylin or thymol blue, show the coccidia with a clear contour with a brown or blue protoplasm on a brown or blue background. Same results on moist preparations fixed with Bouin's liquid. Some moist preparations fixed for half an hour in acid sublimate, washed with water and iodised alcohol and coloured for twenty-four hours in picro-carmine, show a rose-coloured envelope and yellow protoplasm. This last stain also acts very well on preparations fixed with methylic alcohol. Some moist preparations exposed for twenty-four hours to 1 per cent. osmic acid vapour show coccidia, with a brown envelope, yellowish protoplasm on a brownish yellow groundwork.

For the *prophylaxis* of coccidian dysentery of cattle it is necessary to use drugs possessing the greatest sterilising therapy, to effect rapid cure of the animal with complete disappearance of coccidia in the fæcal matter. Of all the drugs used up to now (creolin, lysol, resorcin, sodium hyposulphite, tannin, silver nitrate, sulphate of iron, alum) not one accomplishes this aim. It might be worth while, perhaps, to go to the trouble of trying atoxyl associated with sodium chloride, which, according to Ottolenghi and Pabis, causes E. stiedæ to disappear rapidly from the fæces of rabbits affected with coccidiosis. One might also try chlorhydrate of emetine as well as salvarsan, which give good results in amoebian dysentery of man. But even so there always remains the danger of spread by apparently healthy cattle carriers of coccidia, which, according to Müller, are in the proportion of 80 per cent. in certain districts. The destruction of coccidia outside the animal body and above all in stalls and sheds, is a difficult problem to solve. If it is true that in the mass of fæcal matter the coccidia do not sporulate, they do not die there, but if they come in contact with the air sporulation takes place.

It does not do to count on great cold for their destruction. I have established the fact that E. stiedæ contained in the excrement of rabbits exposed to the great frosts of the mountain, placed on agar at 20–22 degrees, sporulates wonderfully. The different antiseptics seem to me to have quite too little action on the coccidia contained in the fœcal material. Hutyra and Marek advise watering infected fæcal matter with a 3 per cent. solution of sulphuric acid. I have submitted some fæces containing E. zurni to the action of solutions of sulphuric acid 3 to 50 per cent. and to sulphuric acid itself. Even with 50 per cent. sulphuric acid there are forms which preserve their characters for three days. With sulphuric acid itself destruction is very rapid: in less than an hour all the coccidia present shrivel up to a saucer shape. Sulphuric acid is therefore really an agent to be relied on to destroy coccidia. It is to be recollected that solutions of 40 to 50 per cent. associate the fact of the elevation of the temperature to 85-86° C. with the direct action of the acid. The multiplication of coccidia necessitates a certain degree of dampness in external surroundings; the drier a stable is the less easily can the coccidia sporulate. It is, perhaps, advisable to use powdered turf, sand or dry earth in cases occurring in stalls and sheds in order to absorb liquid matter whilst isolating the sick animals as quickly as possible.

The drainage of pastures and the suppression of pools on the edges of which the coccidia preserve themselves and sporulate also renders good service. The replacing of pool water by good potable water should contribute to render less frequent the coccidian dysentery of cattle. I myself have been convinced that running water can play a great part in the spread of the malady from one pasture to the other, carrying the coccidia on the pastures down the river or stream in just such a way as I have verified for bacterian dysentery of man.

The greatest danger, however, is in the stall itself, where the animals are infected one after the other, or where infection is maintained very probably from year to year because no energetic disinfection is carried out.

Conclusions.

1. Coccidian dysentery of cattle is due to a specific coccidium: Eimeria zurni Rivolta.
2. It is chiefly transmitted by ailing animals in stalls, stables, and sheds.
3. Infected abodes not disinfected or insufficiently disinfected maintain infection for ages.
4. For a good prophylaxis the following are necessary (*a*) a strong sterilising therapy of the sick animals associated with their isolation; (*b*) the destruction of their fæces and disinfection of the standing (sulphuric acid); (*c*) the draining of pastures and distribution of good potable water.—*Swiss Veterinary Journal.*

G. M.

THE MERCURIAL COMPOUNDS IN THE TREATMENT OF EPIZOOTIC LYMPHANGITIS.*

BY PROFESSOR GUIDO FINZI,

Royal Veterinary School, Turin.

IN the month of January, 1916, we had the opportunity of trying a method of treatment for epizootic lymphangitis which has given us quite satisfactory results.

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* Extract from the Proceedings of the Society of Foreign Pathology. Vol. X. Meeting of June 13, 1917. No. 6. Translated by Colonel F. Wilson, D.D.V.S., British Expeditionary Force, Italy.

We have had in our hospitals five horses affected with a very serious form of epizootic lymphangitis; elongated–winding, branching cords, with numerous glands involved, with round swellings, in the course of which and between them have developed abscesses giving a discharge of pus streaked with blood in which the cryptococci were clearly visible.

One of the horses had severe lesions on the neck, the chest, and the anterior limbs; another on the fore legs and side of chest, another on the side of chest, on the abdomen and hind limb; and the last one on the neck and face, with bilateral ulcerations of the typical nature, which discharged characteristic creamy pus containing numerous cryptococci.

Malleinisation (intra palpebral reaction, and ophthalmic reaction connected with it) has given us absolutely negative results.

In the less serious cases Professor Pietro Ghisleni, Director of the Surgical Clinique of the Veterinary School at Turin, has first of all sought to obtain a cure with all the available surgical means. But the cases were already too far advanced, and far too serious to hope for a cure.

G. Gasperini* informs us that he cured a foal affected with an extreme form of epizootic lymphangitis by the use of bichloride of mercury "used as in syphilis." The fact is given "without other references."

Being well convinced of the specific curative action of mercury in the protozoid diseases and satisfied that the mercury supplies to their treatment an antiseptic material of great value and its compounds exercise a special therapeutic action particularly effective in a number of infectious diseases, we wished to experiment later to Gasperini, on the value of mercury and some of its compounds for the treatment of epizootic lymphangitis.

The formulas with which we have made the experiments are as follow:—

(*a*)	Salicylate of Mercury	6	grammes.
	Sterilised oil of vaseline	100	,,
(*b*)	Calomel	5	grammes.
	Sterilised oil of vaseline	100	,,
(*c*)	Bichloride of mercury	1	gramme.
	Sodium chloride	2	,,
	Boiled distilled water	100	,,

Knowing the results of treatment with mixtures in certain infectious

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(*) Infective Diseases of Man and Animals, Vol. 11, p. 1171. Ed. Vallardi, Milan. 1915.

diseases, in the end we have experimented with the formula (*d*) an arsenio mercuric mixture.

(*d*)	Benzoate of Mercury	1	gramme.
	Sodium Chloride	0·26	,,
	Acid Cacodylic	0·5	,,
	Boiled distilled water	100	,,

Herewith are the results of the treatment which we carried out with the five horses entrusted to us.

Solution (*a*) By intra muscular injections.—First injection 10 cc. at an interval of 2 days; second injection, 10 cc. at three-day intervals; third injection, 20 cc. with three-day intervals; fourth injection, 30 cc. with three-day intervals; fifth injection, 40 cc. One should give five to seven more injections of the same dose at the same intervals.

Solution (*b*) By intra-muscular injections.—First injection, 5 cc. two-day intervals; second injection, 10 cc. three-day intervals; third injection, 15 cc., three-day intervals; fourth injection, 20. Six to eight injections should be given of each dose, each time increasing the dose by 5 cc. if there are no indications of intolerance.

Solution (*c*) By hypodermic or intra-muscular injections; the injections should be made according to the method previously given.

Solution (*d*) By injections hypodermic or intra-muscular. First injection, 20 cc., two-day. intervals; second injection, 20 cc., two-day intervals; third injection, 30 cc., three-days interval; fourth injection, 30 cc., three-day intervals; fifth injection, 40 cc. One should make five or seven more injections of the same dose, always at the same interval.

With this last formula two horses have been treated and cured.

Naturally the treatment with all mercurial preparations must be carried out with care. The individual susceptibilities are such, and the absorption is so often incomplete and delayed, that it requires careful supervision.

When one sees the symptoms of mercurialism the treatment should be completely suspended and oil purgatives given, the treatment being recommenced after eight or ten days, or when there is no appearance of albumen in the urine, if there has been kidney disturbance.

In one case only (salicylate of mercury) have we been obliged to suspend the treatment. In short, our animals after ten or twelve injections have been returned to the owner perfectly cured.

After three, five and six injections, the cords decrease considerably, become insensitive to pressure, and the initial sores cicatrise.

During the treatment one does not observe the appearance of new abscesses; meanwhile existing lesions become soft and burst spontaneously.

By our results we believe we are able to affirm that among the already known treatments for epizootic lymphangitis, the mercurial preparations are the best for effect and also from an economical aspect; with the injections of mercurial compositions we have obtained the complete cure of severe cases of epizootic lymphangitis, and up to to-day our horses are in the best of health and have shown no relapses.

According to our researches the formulæ (*c*) and (*d*) are those which give the quickest cure.

A BOXING COMPETITION "SOMEWHERE IN ITALY."

In the Army, as is well known, all sport plays a very important part in keeping the men "fit" and in condition, and wherever the Britisher goes one may rest assured that exhibitions of the "boxe" will be well to the fore. During the past month at a town "somewhere in Italy," where there are stationed a large number of men of the R.A.M.C., A.V.C., and A.S.C., a show of this kind was arranged for

R.A.M.C., A.V.C. and A.S.C.—A Group of Competitors in an International Boxing Contest, "Somewhere in Italy."

the benefit of the wounded men of both nations. By kind permission of the Municipality the ring was erected in the centre of the Opera House, a building which for arrangement and decoration would rival some of our best in England, and the crowded condition of the boxes and stalls—in fact, every part of the house—testified to the popularity of the entertainment. The names of one of the Chief Ministers of the Italian Government and some very high British Military authorities were in the list of patrons, and the Committee was composed of representatives of each nationality. The referee was a well-known R.A.M.C. Colonel; one judge, well known in the racing world at home, belonged to the Remounts, the other to the R.E. Service, and the time-keeper to the Army Veterinary Corps; whilst the master of ceremonies belonged to the Army Service Corps; so that the various services were well represented. Stewards and seconds were members of the R.A.M.C., A.V.C., and A.S.C., and there was a very large and appreciative audience of British and Italian soldiers, as well as a crowd of the residents in the town.

The enclosed photograph shows some of the British competitors, and the programme included contests between various corps' representatives, between British and Italians, and between the Italians themselves.

During an interval a musical programme was introduced, together with lantern slides of the war front in Macedonia. Italian masters of the science of fencing gave exhibition bouts in this very graceful excercise, their skill in attack and defence being much applauded.

Altogether it was a gathering of useful import in further cementing the *intesa* or *entente cordiale* feeling of good fellowship which has always existed between England and Italy.

Reviews.

WOUNDS OF ANIMALS AND THEIR TREATMENT. By R. Harrison Smythe, .M.R.C.V.S., pp. xii+194; 30 plates and figures in the text. Price 6s. nett. Published by Baillière. Tindall & Cox., Henrietta Street, Covent Garden, London, W.C.2.

Mr. Smythe has done the profession a service by publishing in so concise a manner a *resumé* of the latest methods upon which the treatments are based, and the work is particularly interesting just now to the young practitioner who has just "joined up" for active service with the Army.

It summarises in a very concise manner the various wound treatments, including general treatments and those best suited for special cases. Sir Almroth Wright's Opsonin Theory receives a chapter to itself, and the centre of the book deals with wounds of special parts of the body, whilst other chapters are devoted to the wounds of war, to the use of vaccines in wound treatment, and to the beneficial effects of rational dietetics and hygiene. Well bound and of small compass, so that it can be easily carried about, the book is one which the veterinary officer on active service cannot well afford to be without if he wishes to keep himself up to date in this all-important branch of his professional duties.

REPORT OF THE TWENTY-FIRST ANNUAL MEETING OF THE UNITED STATES LIVE STOCK SANITARY ASSOCIATION—CHICAGO, DEC. 3, 4, 5, 1917.

This is the Report of the proceedings of an Association formed for the study of sanitary science, and the spread of information and methods pertaining to the control and eradication of infectious diseases amongst live-stock. The meetings are held annually, and good educative work is being done, the membership of the association comprising persons engaged in live-stock sanitary work for Federal State, Territorial, County, or Municipal Governments, or anybody interested in live-stock sanitation. From the list of subjects dealt with at this meeting, and the discussions which followed, the great value of exchange of ideas and opinions between professional men and those engaged in the care, management and breeding of live-stock may be estimated.

It was never so necessary to reduce in every possible way the animal losses from infectious diseases and other preventible causes. Meat, milk, and leather—animal derivatives and human necessities—were never so scarce and valuable. Housing, transport, and hygienic questions, all tending to improve and save animal life, need missioners in every district and locality. This Association is doing both mission and propaganda work.

The subjects dealt with and discussed include Bovine Tuberculosis, Plan for Branding Accredited Herds, Contagious Abortion in Cattle, Necrobacillosis in Swine, Hog Cholera Controls, Blackleg and its Prevention, Cleaning and Disinfecting of Stock Cars, Proposed Regulations for Accredited Herds. Committees have investigated some of these diseases and the problems connected with them, and the publication is a vast mine of experience in connection with some of these diseases. The difficulties surrounding their combating and control can hardly be understood by those who do not take an all-round view of the subject, such as is provided in this little work. Yet through all the problems and obscurity we can see how observant and trained men are grappling effectively with all obstacles, and working away to obtain healthy stock and the blessings of good sanitation. Perhaps nothing in the Report struck us so much as the case mentioned by Mr. Tuttle of 50 cows, eating and drinking out of a common manger, in which testing with tuberculin gave 11 per cent. of reactors. Six months afterwards—after partitions had been put between the cows, so that the cow in one partition could not get any feed or water from a neighbouring partition—the percentage of reactors was only 4. Each cow had an individual stall, and was kept there as long as she remained on the farm. Any veterinarian who requires this Report, and it is really well worth reading, may obtain it through Dr. Campbell, 9, South Clinton Street, Chicago, U.S.A. G.M.

Correspondence.

THE EFFECT OF A SHELL FRIGHT.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—The following "case" will, I feel sure, be of interest to you, if you can find room to publish it. Black troop horse, in good condition. Standing close (say 50 yards) from one of the Canal d'Oise bridges, when the R.E. blew it up with gun cotton. Horse suddenly went apparently mad. Danced around, kicking at everything; put two men in hospital. Then gave loud screams and eyes became red and fiery; looked like a raving lunatic. After an hour of this behaviour, as no one could get near to it, we had it shot. It is the only case of real shell shock that I have heard of in horses.—Yours faithfully,

R. S. TIMMIS,
Major, Royal Canadian Dragoons.
(Author of "Modern Horse Management," etc., Cassell and Co.)

Personal.

DR. JOHN ROBBINS MOHLER succeeds the late Dr. Melvin as chief of the Bureau of Animal Industry. He has been in the service of the Bureau sinc e1897, and is a broad-minded, far-seeing, energetic man. He has translated a number of scientific works, and as a pathologist bacteriologist, and meat inspector, is right in the front rank. Under his guidance and direction the Bureau of Animal Industry will add fresh laurels to its reputation for good work done in all the fields and problems of animal disease.

Obituary.

THE LATE MR. JOHN HAMMOND, M.R.C.V.S.

THE death of Mr. John Hammond took place at Bale, Norfolk, on April 22nd last. The deceased gentleman, who was in his 89th year, had been ailing since Christmas, but the end came with rather unexpected suddenness.

As a veterinary surgeon he was well known throughout Norfolk, where he carried on a most extensive practice, which he only relinquished to his son on attaining the age of 70.

He was a man of unique personality, a champion of all that was right, with great determination and will power, and when convinced of the righteousness of a cause he would fight for it to the bitter end, for there was no turning back with John Hammond; yet withal he had a very tender and sympathetic heart, and was always ready to assist those in poverty or distress.

Overhanging the mantelpiece of his office was the text, "Whatsoever thy hand findeth to do, do it with all thy might." This may be accepted as the motto of his life, for in every detail of his various callings he was intensely thorough.

He was the oldest County Council Inspector in Norfolk, and during the cattle plague epidemic in the early sixties he took an active part in stamping out the disease. It is stated that he was the first veterinary surgeon in England to detect the existence of rinderpest in sheep.

The late Professor Simonds doubted the accuracy of his diagnosis until a special visit to Norfolk convinced him of the correctness of the report. Then followed a lengthy paper from the Professor, which contained no allusion to the work of John Hammond.

About 1892 Mr. Hammond was asked to give evidence in an interesting lawsuit—Pratt *v.* Harvey Mason. The red poll bull "Magiolina" had been purchased by Mr. Pratt from Mr. Mason's herd for 200 guineas. Subsequently it was stated the bull was impotent—hence the action. The case was tried at Birmingham, and the plaintiff had for his expert witnesses the late Sir George Brown, Professor J. Penberthy, and Mr. Taylor. They all stated that the bull was affected with paralysis of the erector penis muscles, and that he would be permanently impotent. For the defence Mr. Hammond said he considered the ailment was due solely to overfeeding, and insufficient exercise, and that with judicious treatment the bull would recover. With such formidable experts, of course, the case went against Mr. Mason—the bull was returned to him, and he made Mr. Hammond a present of the animal. The bull was turned outdoors and soiled, and ultimately served several cows. Many of his progeny were included in Mr. Hammond's dispersal sale. Mr. Hammond then wrote the three veterinary surgeons who gave evidence for Mr. Pratt, and Professor Penberthy's reply was rather amusing. "When the potency of your Norfolk air becomes known there will be a great influx of visitors to your coast."

In 1890 he came into conflict with the veterinary officers of the Board of Agriculture respecting the origin of an outbreak of bovine pleuro-pneumonia at Lord Leicester's. Every detail in connection with this case was brought before the members of the Eastern Counties' Veterinary Medical Association, and a resolution was unanimously passed that the theory advanced by the veterinary officers of the Board was unsupported by the "facts and history" of the outbreak; but even this verdict did not go far enough for John Hammond, for a further report was published in the local press and in almost every agricultural paper in England. In addition to his veterinary practice he farmed extensively, and established one of the most noted herds of red polls in the country. The foundation stock was a cow named "Davy," presented to him by his father about 1850; and it is no exaggeration to say that the best red poll herds of the present day are infused with the "Davy" or "Davyson" blood.

As an exhibitor he was very successful at Smithfield, the Royal and County shows, and he had the honour of being presented by the then Duke of York with two oil-paintings of bullocks that had been purchased by the Duke from his herd and had won prizes at the London "Fat Stock Show."

In early life he distinguished himself as an athlete. He excelled in most of the games of the day, and had jumped 5 feet 9 ins. high. He was also a first-rate shot. He discharged various public offices, and for 55 years in succession was elected churchwarden at Bale. He had most pronounced religious convictions—was a Churchman of the Evangelical type, and had no sympathy with High Church forms and ceremonies.

Of the thirteen children of his marriage, five died in infancy. His second son, John, succeeded to the practice, and his youngest daughter is married to Mr. G. H. Gibbings, of Tavistock.

The funeral took place on April 26th, and was very largely attended, the little rural church at Field Dalling being insufficient to accommodate the numbers who had assembled to pay a last tribute of respect to one whom they all admired and many loved.

The profession has lost an honoured member, but the name of John Hammond will still live in the memory of those who enjoyed the privilege of being called "friends."

"So he passed over"—"And all the trumpets sounded for him on the other side." G.

ALEXANDRE FRANCOIS LIAUTARD, M.D., D.V.M.

THE world-renowned veterinary surgeon Alexandre François Liautard, M.D., D.V.M., died at his home at Bois Jerome (Eure) in France, on April 20, 1918, in his 84th year. He graduated from Alfort in 1856, and three years later went to America, and it was with veterinary matters in this great continent that his life work was spent. He was one of the organisers of the Veterinary Medical Association of the U.S.A., and acted as its first secretary. He became Dean of the New York College of Veterinary Surgeons in 1860. In 1875 he organised the American Veterinary College and acted as Dean until it became amalgamated with the New York University in 1899.

Dr. Liautard's whole life was devoted to veterinary teaching, and as an anatomist and teacher and an illustrator of lectures by crayon drawings he has never been excelled. He edited the American *Veterinary Review* for over forty years, and was a prolific contributor to its pages. He was the author of many veterinary text-books. In 1884 he was decorated by the French Government as Chevalier du Mérite Agricole, and in 1880 he was elected one of the Honorary and Foreign Associates of the Royal College of Veterinary Surgeons.

The whole veterinary profession owes a great debt to Dr. Liautard for his sterling and pioneer work in connection with its establishment and advancement. A busy, active, intellectual, and broad-minded man, he was greatly loved and respected by all who had sat under him or who had met and known him. The gap caused by his loss is genuinely lamented, but there is great consolation that such a man lived for the veterinary profession and was spared for over sixty years to work well and vigorously in its establishment, uplifting and advancement.

DR. ALONZO DORUS MELVIN.

Dr. Alonzo Dorus Melvin, Chief of the Bureau of Animal Industry Department of Agriculture, U.S.A., died at Washington from pulmonary hæmorrhage on December 7.

Melvin was one of the veterinary stalwarts of America. He was ever progressive. He stamped out three outbreaks of foot and mouth disease; he eradicated the cattle fever tick in 51 per cent. of a great extent of Southern territory; livestock industry and meat inspection laws advocated by him were enacted by Congress during his term of office. In 1890 he came to Liverpool to inspect animals and vessels from the United States. He was the author of numerous works dealing with animal diseases and animal industry topics. He is survived by his widow, who was Miss Ella Harriman, of Bootle. He leaves a daughter, Marietta, and a son, Fordyce, who is a sergeant in the U.S.A. artillery.

THE LATE JOHN HAMMOND, M.R.C.V.S.

THE LATE ALEXANDRE FRANCOIS LIAUTARD,
1835-1918.

THE

VETERINARY JOURNAL

Editor :

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,

HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

JULY, 1918.

Editorials.

IS THE PRACTICE OF MEDICINE MORE AN ART THAN A SCIENCE ?

ART may be described as the employment of means to some end on certain principles with which we are familiar, and implies skill of a practical, useful or technical nature in carrying the work out. "Art is long and life is short," and in its practice the skilled observer will be gathering jewels of varied value and lustre from his cradle to his grave. The proper combination and setting of these jewels of experience will denote the finest and most finished work, and bring to the workman a distinction which will be both satisfactory and good. Intuition must have its prominent place in the matter and a balanced and trained observation be able to discern that which is effective, progressive and permanent from the futile, stationary and temporary. The full and fruitful practice of an art does not, as a rule, develop early in life; it involves close application, study and deduction over an extended period. Many a true artist has exclaimed: "I have only just learned how to live in my appointed sphere when it is time to die." The art of medicine is no exception to the rule that he who travels always on the beaten track is a sorry wayfarer, who misses much that is useful, edifying and valuable. The great artist is he who can produce the best results from experimental work carried out by himself or others. The general practitioner can advance his art by taking notes of his cases and analysing and discussing these notes. Instead of "dying with all his music in him," it is his duty to conserve and pass on to his fellows the knowledge and experience that he has acquired whilst living laborious days. The description of detail which future years may deem essential or non-essential is important, and can be recorded by any man with a retentive memory and a correct vision. In the quiet by-ways of practice, as well as in its hurry and scurry, art may be picked up and put down. The best primary results in the art of medicine will probably arise where the field for labour is wide and extensive and the workers distinguished and occupied separately in regard to duties and their performance. A disease having been recognised and classified, then let separate bodies of artists attack it each in their several ways. The ability of the workers will vary, but each, if true to temperament, will soon recognise whether his work is going to be a success or failure. The advance of medicine depends on a recognition of the disease, consideration of the means available for attacking it, detailed application of the means, notes, reasonings and deductions from the details. There are many ways of dealing with mange; perhaps most of them may be effective, but the proper application of them depends on the true art of the operator. There has been a vast domain for the earnest and painstaking artist in medicine in the present war, and it is very gratifying to see how numerous discerning men have responded to the call for keen observation, deduction, and copious note taking. As a result the ranks of the artists in medicine cannot but be improved both in quality and quantity. The faculty of sound deduction is a valuable attribute to the study of the art of medicine.

Just one point about deductions: These may be true or false. It is not given to every man to be able to discriminate between the two. A certain doctor who was going away on a holiday engaged a *locum* and had a day with him before departing on his vacation. During the day a call to a critical case came, and the doctor and the *locum* attended together. After seeing the case the following conversation occurred.

Locum: "My word, doctor, you soon diagnosed that case. However did you know, without taking the man's pulse, or looking at his tongue, or examining him carefully, that his illness was caused by eating too many oysters?"

Doctor: "Oh, simple enough, my dear man. I saw the shells under the bed."

The deduction happened to be right. Doctor returns home from holiday; *Locum* meets him and tells him of a wonderful case he has had that very day of a man seriously ill from eating too much horseflesh, and that he diagnosed the case at a glance.

"And pray how did you do it?" said the doctor.

"Oh, easy enough, my dear fellow," said the *locum*, "I saw the saddle under the bed."

The deduction happened to be wrong. The moral is that the true artist in medicine must be sound in his deductions if his treatment is to show effective medical results. G. M.

THE DIETETIC VALUE OF HAY-LOFT SWEEPINGS.

A PAPER under the above title, by Professor Linton, in the present issue of the VETERINARY JOURNAL, is of special interest at the present time when everything with any prospective value is utilised. It is of especial importance to those who have large numbers of Army animals under their care, because in most units, and in the Veterinary Hospitals especially, where every care is taken to economise, teach economy, and utilise every available scrap of fodder, it has been the practice for some time to shake out the hay used for feeding (and to fill the hay nets) over a wire screen, solely with the intention of saving the hay seeds which would otherwise fall to the ground, and be trampled in the mud or otherwise wasted.

These hay seeds are utilised in the same manner as chaff, and up to the present time have been considered as a most nutritious and valuable adjunct to the horse's ration. It is, therefore, with some surprise that we read the deductions and conclusions drawn by Prof. Linton that "there does not seem any justification for the opinion that great benefit would be derived by adding loft sweepings to the diet of horses." It is true that at times, when mouldy and dirty hay is the ration issue (and in war-time this must occasionally occur), there is a considerable amount of dust, and at times this causes the screenings to be condemned; but the general opinion of those who have used the hay seeds as chaff (the latter not being obtainable), is that considerable benefit has resulted to the horses; and for the purpose of saving this, large square boxes with a movable wire lid have been devised, and are provided in the necessary numbers for every Veterinary Hospital.

The Order in most Veterinary Hospitals, and in many units in the Field, too, is that the hay should be spread out and the hay nets filled on the top of these. The resulting accumulation of hay seeds and small brittle hay "bents" is enormous in quantity, and will give the debility cases in a hospital quite a lot of hold—aromatic when steamed, as admitted by Professor Linton, and certainly a stimulant to a hesitating appetite. It may be that a false opinion is formed as to its nutritive qualities, but this can only be proved, as Professor Linton suggests, by a series of properly-carried-out experiments, and until these have been done, and the results published, there will, certainly be no hesitaion in "carrying on" the present system as the impression, gained trom clinical results, is that there is considerable nutritive value gained which would otherwise be wasted.

LADIES' AUXILIARY VETERINARY RELIEF FUND

It is interesting to read in the *Journal of the American Veterinary Medical Association* the following notice :—

Ladies' Auxiliary Veterinary Relief Fund Committee.—Eligibility to membership will include the wives, mothers, daughters and sisters of all veterinarians in the United States and Canada. The president, Mrs. W. H. Hoskins, was empowered to appoint a representative for each State to serve as a medium for communicating when necessary with the individual women within her jurisdiction, and also as a medium for them to communicate with the officers of the national organisation. It is earnestly hoped that every woman eligible to membership will avail herself of this opportunity to assist others, and through community of interest learn to know more of other women connected with veterinary affairs. The annual dues will be 50 c., payable to each State representative, who in turn will transmit them to the national treasurer. The fee for each individual is small, but if the ladies respond as is hoped, the total would make a working basis for definite war relief work. Subscriptions of larger amounts will be acceptable, but the annual fee of 5 0c. is all that is required for membership. President, Mrs. W. Horace Hoskins, 135 E. 30th Street, New York City ; recording secretary, Mrs. Charles E. Cotton, 3145 Portland Avenue, Minneapolis ; corresponding secretary, Mrs. Asher Lockhart, Veterinary College, Kansas City, Mo. ; treasurer, Mrs. H. Jensen, 1320, Main Street, Kansas City, Mo.

Whether this refers to an association like the Victoria Benevolent Fund, which is doing such magnificent work in England amongst those whom misfortune has overtaken, or whether it is intended to afford similar splendid help and encouragement to the soldiers of the American Army Veterinary Corps as is being done to those of the British Service by the kind thought and hard work of Mrs. Moore and her earnest co-workers, is not quite clear. Probably both are intended, and certainly no better examples could be copied ; and in any case we give a cordial word of praise and welcome to the kindly thought which prompted the ladies whose names are mentioned to start such a splendid idea. We are sure that it will meet with the approval and support of everyone who is connected with the profession in America, and especially those who are eligible for membership.

Original Communications.

THE DIETETIC VALUE OF HAY-LOFT SWEEPINGS.

By R. G. LINTON, M.R.C.V.S., Professor of Hygiene,
Royal (Dick) Veterinary College, Edinburgh.

THE possibility of hay-loft sweepings—euphemistically called "hay seeds"—being more generally utilised to augment the present-day restricted animal rations has been, it is known, under consideration. In fact, sweepings that have lain in lofts for many months have been collected, more or less cleaned, cooked and fed to horses.

The name "seed" is at once suggestive of a rich store of nutriment, and this has doubtless led some horse feeders to think that the partial cleaning and preparation of these sweepings would be a profitable undertaking, inasmuch as their use might effect a saving of more costly food.

Loft sweepings consist of cut and broken hay and straw, chaff, a fair quantity of immature "seeds," a variable amount of sand, dirt, and debris of all kinds, including excretal matter of rats and mice. The seeds, as one would expect, are light in weight, consist chiefly of husk and contain very little "kernel." Including dirt of all origins, loft sweepings have an average weight of about 8 lb. per bushel, 10 lb. being probably the maximum, while the recognised weight of Italian rye grass seed is 24 lb. per bushel. If, therefore, weight per volume is any guide, hay-loft sweepings cannot contain an appreciable proportion of mature seeds. That such seeds as are present consist of little else than husk is clearly shown in Fig. 1. The cylinder on the right contains 1 ounce by weight of Italian rye grass seed of 99 per cent. purity; that on the left, 1 ounce of seeds cleaned of dirt and straw, that were obtained from a loft used to hold rye grass hay. In order that no shaking down could occur, the material was poured into cylinders without bottoms.

There are various methods of dispcsal of loft sweepings. They may be thrown on the manure pit or to fowls; they had a pre-war market value ranging from 1s. 6d. to 2s. 6d. per cwt. to merchants who found a profitable use for them; sometimes stock-keepers get rid of them by adding a shovelful now and then to the food of their horses and cattle. Lastly, they may be washed in several changes of water, steamed or stewed, and mixed a few pounds at a time with any other food that may be given.

Although the practice of giving uncleaned sweepings to live-stock may be followed for a time apparently without danger, it is certainly not one unattended by risk. A dairy farmer well known to the writer added a bag of the seeds to the mash of his cows; practically every cow in the herd became ill, and, though no deaths resulted, the ill-effects were quite pronounced. Specific forage poisoning, due to *bacillus botulinus*, has not, so far as the writer knows, occurred or been proved to occur in this country, but unquestionably it is seeking such or similar trouble to feed material heavily contaminated with vermin excreta and containing a high proportion of other dubious dirt.

Apart from the hygienic aspect, it is of interest to enquire into the potential feeding value of these sweepings. For this purpose two samples were taken for examination. One sample (A) was obtained from a loft that had probably contained all kinds of hay and straw; it is of especial interest, as the material was actually being washed and fed to horses. The second sample (B) was taken from a loft that was kept cleaner than usual, and that had held only rye grass hay. The sweepings, as stated, contain a certain amount of broken hay and straw, and as in practice this forms an integral part of the material, no attempt was made to remove it before each sample was analysed.

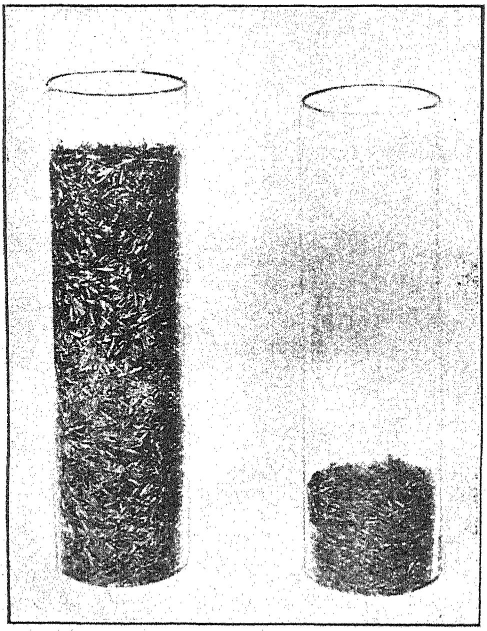

FIG. 1.—Each cylinder contains 1 ounce by weight of hay seeds; on the right pure rye grass seed, on the left "seed" from loft sweepings.

Of sweepings A, a sample was taken just before it would have been washed; ½ lb. was separated into three lots with three grades of sieves—30 meshes per square inch, 120 and 600. The three siftings are shown in Fig. 2. No. 1 consists of hay and straw, and weighs

2½ ozs. ; No. 2 of seeds and weighs 3¼ ozs. ; and No. 3, of fine dust weighing 2¼ ozs. Thus it is seen that the greater part of so-called hay seeds is hay, straw, and dirt. Of the same lot of sweepings a sample, A^1, was taken after it had been washed in three changes of, water, which, while removing the greater part of the heavy dirt, made a decoction of vermin excreta and other objectionable matter.

This sample, after most of the water had been squeezed out of it was air-dried and analysed. Sample B, a much cleaner lot than A, was subjected to analysis without any preparation, as on the premises from which it was taken it is the practice to dispose of the sweepings by adding a little now and then to the horses' food while it is being mixed. Its analysis is given in the table, and the cleaned seeds are shown in Fig. 1 photographed with pure rye grass seeds for comparison. In order to determine the potential feeding value of pure rye grass seeds the sample shown in the figure was analysed, the result being added to the table.

Analyses of loft sweepings, Italian rye grass seeds, and, for comparison, a good sample of meadow hay:—

	Moisture.	Protein.	Fat.	Carbohydrate.	Fibre.	Ash.
*Washed Sweepings, Sample A^1 ..	10·83	13·15	1·53	47·46	22·16	4·87
*Unwashed Sweepings, Sample B ..	12·53	13·15	1·23	37·69	20·89	14·60
*Rye Grass Seeds ..	14·80	8·75	0·60	42·66	28·96	4·23
Meadow Hay ..	14·00	9·80	3·00	41·40	26·20	6·00

It is necessary to draw attention to the percentage of crude protein in the loft sweepings, as indicated by analysis. That the percentage should be equal is merely a coincidence, and the evidence of these two samples must not be taken as representative of all such material. Furthermore, and this is of great importance, the percentage of crude protein as here shown is calculated by multiplying the total nitrogen by 6·25, the recognised factor for cattle foods. There is, therefore, no distinction made between true protein and amides, or non-protein nitrogenous substances, and as the sweepings contain a high proportion of dirt and excretal matter containing nitrogen of no nutritive value, the protein content as here estimated is an inflated one. Since, however, the object of this paper is to show the maximum amount of nutriment that *might* be obtained from such material, rather than its actual value, the total nitrogen present has been credited.

The selection of digestion coefficients suitable for this class of food is essentially speculative, and those applicable to a medium grade meadow hay have been taken, namely: Protein, 58; fat, 18; carbohydrate, 58; and fibre, 40. For the purpose of calculating the net dynamic value an availability of 65 per cent. has been assumed. (Kellner's V.N. for good meadow hay is 67.)

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*Analysis made by Prof. G. H. Gemmell, F.I.C.

Using these assumptive factors, then, the three samples of "seeds" may be considered to have a net dynamic value as shown below. For the purpose of comparison with other and more commonly used foods the dynamic values of meadow hay, oats and maize have been added to the table. The values have been expressed in terms of starch equivalent (for fattening or work), per 100 lb. of each food, and in Calories per pound.

	Starch equivalent, per 100 lb.	Calories per lb.
Washed Sweepings, Sample A[1] ..	29	495
Unwashed Sweepings, Sample B ..	25	427
Rye Grass Seeds	27	461
Meadow Hay	30	513
Oats	58	1,000
Maize	77	1,320

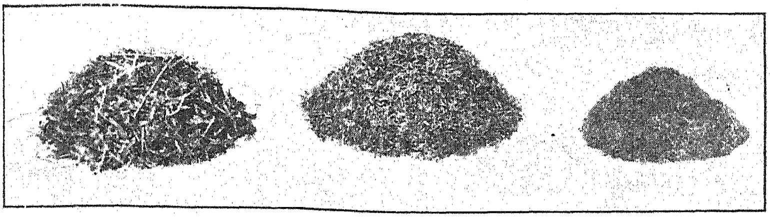

FIG. 2.—Half a pound of loft sweepings separated into three lots—hay and straw, "seeds," and dust.

If the samples A and B are at all representative of this class of food, the food value of loft sweepings may be considered as approximately that of a fair grade meadow hay; at least there is no evidence that they have any higher value, but possibly a lower one. For reasons already stated the crude protein content, as indicated by analysis, must be considered as excessive; neither hay-loft sweepings nor pure rye grass seeds are protein-rich foods, as the layman might think. The N. Ratio of Italian rye grass hay is 1 : 9, and that of the seeds 1 : 7·6.

There does not seem any justification for an opinion that great benefit would be derived by adding loft sweepings to the diet of horses. On the contrary, it would appear to be a practice attended with some danger whether the seeds be cleaned or not. If much energy and fuel be expended in cleaning and cooking the material there can be no economy in its use.

There is no doubt that stewing the sweepings, provided they are not too dirty, brings out the pleasant aromatic odour characteristic of steamed hay, and such material when added to cut straw and oats may stimulate a hesitating appetite and thus lead to a false impression as to its real nutritive value. This can only be determined by a series of feeding experiments carried out under standard conditions and with due regard to possible fallacies.

THE NORMAL ERYTHROCYTE COUNT OF EAST AFRICAN NATIVE CATTLE.

By Capt. H. E. HORNBY,
South African Veterinary Corps.

THE commonest variety of cattle in East Africa is a small, short-horned, humped animal, and it is found in Northern Rhodesia, Nyasaland, "German" East Africa, British East Africa, as well as in those few parts of Portuguese East Africa north of the Zambesi where native cattle are seen. In parts of Uganda, and the adjoining parts of British East Africa and "German" East Africa, one meets with a straight-backed, large-horned variety of cattle, but of these I am without experience, and my remarks apply only to the former variety.

In a fairly recently published text-book that I picked up at Dar-es-Salaam, namely Marek's "Lehrbuch der Klinischen Diagnostik der Inneren Krankheiten der Haustiere (1912)," the following are given as the normal erythrocyte counts of cattle:—

Bulls	6,5——7	Mill. per Cmm.
Cows	5——6	,, ,,
Oxen	5——6,5	,, ,,
Young stock	7——	,, ,,
Calves	5——8,5	,, ,,

If I remember rightly, similar figures are given in most text-books that deal with the subject. On the other hand, I see in an odd number of the *Centralblatt* that I have just found (Centralbl. f. Bakt I Abt Bd. 74. Heft 1/2. 1914), that Lignieres, in an article on "Bovine Anaplasmosis in the Argentine," gives as high a figure as 8,400,000 per cmm. to represent the red-cell count of a common cow of that country.

During the past five years I have had occasion to make a good many blood counts of cattle in various parts of Northern Rhodesia, Nyasaland, British East Africa, and "German" East Africa, and among them were some of normal, healthy cattle. As an opportunity for the continuation of this work may not be given to me, I publish these few figures as an indication to workers on tropical diseases of what is likely to be found to be the normal erythrocyte counts of East African native cattle.

The haemacytometers used have been those of Thoma-Zeiss, and their accuracy and the correctness of my technique I have tested from time to time by making examinations of my own blood and comparing the results with the well-known standard. Also as I have, when using the same instruments and technique, encountered bovine blood-counts as low as 2,000,000 in certain very anæmic conditions, I think that the high figures I am about to record can be looked upon as representing an actual state of affairs.

Animal.	No. Exd.	Minimum.	Maximum.
Bulls	1	9,700,000	
Cows	2	7,800,000	10,000,000
Oxen	1	9,600,000	
Young stock ..	3	8,000,000	11,200,000
Calves ..	5	9,500,000	15,000,000

All the above animals were in robust health, with, perhaps, the exception of the heifer with the count of 8,000,000.

In the text-book mentioned above it is stated that "with the exception of the newly-born and very young, immature animals in general show a somewhat higher blood-count than do adults of the same species." Also "male animals generally show a higher count than do the corresponding females." My own experience is that both these statements are correct, but my data is too scanty to be of value in corroborating them.

PERIODIC OPHTHALMIA.

By H. C. WILKIE, F.R.C.V.S., F.Z.S.,
Paris.

I HAVE been reading the report of the Conference of Officers of the French and British Army Veterinary Service held recently in France, and have been much interested in Colonel Newsom's paper, and the discussion which followed, on Periodic Ophthalmia.

As the treatment there given is necessarily only in outline, I have thought it might perhaps interest someone if I gave a few notes of a method of procedure in treatment which I have found most useful. Although we have no exact knowledge of the cause of the disease, I think most of those who have had to deal with it now believe it is due to a specific organism. On this assumption I (and probably very many others) have formed the opinion that the point of entry of the organism is by way of the conjunctiva, and further, that the organisms or their living spores are contained in dust. This theory, to me, is supported by the fact that I have never heard of any cases among horses which were not living on dry foods, and have not been able to discover any information of cases, either primary or secondary, occurring in horses living entirely on grass.

I personally feel considerable doubt as to the periodicity of the disease, if by that term is meant a further and fresh attack wholly apart from the possibility of a new infection. There are two special points with regard to treatment which have been sufficiently successful with me to make me consider them definitely essential.

The first is the thorough cleaning of the conjunctival sac as a preliminary to other treatment.

The second is that with a view to the prevention of further infection all food given, hay as well as manger food, should be damped, and this, I think, is *very important*. Damping the food might indeed well be adopted in all outbreaks, merely as a measure of prevention.

The cleansing of the conjunctival sac, with a view to cutting off the supply of infection from any lurking organisms, must be very thoroughly done. I have found it is best to use for the purpose a hot solution of boric acid. If the eyes are first fomented with the hot solution, the patient evidently finds relief from the heat, and soon there is no difficulty in thoroughly irrigating the conjunctival sac in all its folds, though this requires the utmost care and patience.

After this irrigation, an injection of 2 c.c. of Lugol's solution of iodine is made into the supra-orbital fat, and then, after giving the patient a short rest, a few drops of a solution of perchloride of mercury, 1 in 4,000, are placed within the lower lid near the inner canthus. The lid is held down for a few seconds, in order to prevent the solution coming into immediate contact with the cornea. This preliminary cleansing effectively carried out well repays one for the trouble. It gives the treatment an excellent start, and if the surroundings are good, and only damped food given, I think the examination next day usually shows that the case is well in hand, at any rate where it is in a reasonably early stage.

As it is essentially a condition of iritis primarily, I believe it is quite necessary to *keep* the iris under the influence of atropine, and to prevent all exposure to any but subdued light whenever possible.

With regard to the control of blood pressure, adrenalin in solution is not always in the best condition, and more reliance can be placed on epinine, which is a much more stable substance, and appears to be fully as effective. The bowels should, I think, be kept well open.

Early diagnosis is rather important, and I think cases can be picked out when in an early stage by the appearance of extremely fine vessels, normally invisible, which show themselves just outside the circumference of the iris, and often, I believe, first on the inner side as a hazy pink patch, a condition which occurs before more active symptoms call attention to the case. I do not wish to dogmatise on this point, but I have noticed the condition several times, and I only give the observation for what it is worth.

The whole general history of periodic ophthalmia seems to me to give warrant to the assumptions upon which the treatment described in these notes is based, that is that the disease is due to an infection, conveyed in dust, and which obtains entry by way of the conjunctiva.

MILK DEFECTS IN THE COW AND THEIR REMEDIES.

By G. MAYALL, M.R.C.V.S.,
Bolton.

Failure in secretion may arise from dietetic causes, such as lack of albumen in the food, or too watery food, changes of food, use of too many and varied feeding-stuffs, and damaged food. Cold, damp weather, anxiety about calves or stall companions, and œstrum, hinder milk secretion. Occasionally this defect comes on suddenly in primipara, and without any ascertainable cause.

The remedies in such cases consist in the prescribing of fennel, coriander, carraway, aniseed, or juniper berries, in union with flowers of sulphur, antimony, and salt. Scalded food, mashes, and brewers' grains may be given. A good prescription for lack of secretion is a powder of : Flowers of sulphur, ½ drachm ; fennel, ½ ounce ; juniper berries, ½ ounce. Give one two or three times daily. Another one is : Antimony sulphide, ½ ounce ; aniseed, 1 ounce ; given two or three times daily in fennel tea.

The failure in secretion due to diseases is sought to be remedied by appropriate treatment of the patient.

Watery Milk is caused through food poor in protein, watery food, weak digestive power, and wasting diseases.

Internal bitters and remedies that aid digestion are indicated together with change of food. Foods which increase the fat content of milk are palm seed oil, cocoanut oil cake, and peanut meal.

Salty Milk arises from intestinal catarrh, or inflammation of the udder, and these diseases must be treated to remedy the defect.

Bloody Milk.—The milk on standing deposits a red layer at the bottom. It is caused by rough milking and impatient sucking. It is seen in increased blood pressure in the udder in heifers and good milkers. Quick change to intensive food, such as clover pasture, may cause it. The remedies are gentle milking, spare, cooling diet, laxative medicine, and 2 drachm doses of liquor ferri perchlor fort, which has given excellent results with us.

Bad Smelling Milk arises from pasturing on low meadows ; feeding on spoilt food (the giving of rancid meal, or bad silage), and gastric affections, with decomposition of food in the rumen, appear to favour it. The remedy is to change the diet and treat the digestive trouble.

Bitter and Rancid Milk—due to lupines, decomposing roots, rancid oil cake, littering on mouldy leaves. The milk of old cows sometimes has a bitter taste, which is difficult to account for.

The remedies are aromatic bitters and salt, with magnesia, calcium and potash derivatives.

These are some of the chief defects met with by us in cattle practice, and a short summary of them may be of interest and benefit to our readers. We shall be glad to receive any communications on the subject from those engaged in cattle practice.

SODIUM SULPHATE EXSICCAT.

By W. LOTHIAN, M.R.C.V.S.,
Duns.

Some of the veterinary profession are anxious for a substitute for linseed oil. This winter I have used, in many cases of colic, sod. sulph. exsic. with very good results and far more satisfaction than linseed oil: 6 ozs. (exsic.) dissolved in a quart bottle of warm water. This may not purge, but it renders the bowel contents easy to pass along. It agrees well with horses in these cases, is not nauseating, nor leaves the mouth in a dirty condition; in fact cleans it, and takes effect quickly. Two or three cases I had where the pulse got up rapidly, and breathing was affected, as if hardened ingesta had accumulated about the flexures of the colon, with some irritation, The sod. sulph. moved this on nicely, and next day the animal was greatly improved or wholly better.

I always carry one or two packets with me, and consider it so very much superior to linseed oil in all respects that I would not now use the oil at all. One never sees that sickly, nauseating, paralysing effect in bowel cases which one sees after administering oil. In every respect I like it better; and another merit it has which I, as a true Scotsman, must not omit to mention—that of *cheapness.*

In all the cases one dose answered the purpose, but another dose could be given next day. Of course, unlike whisky, don't repeat in an hour; wait till next day.

THE CONTROL OF LICE ON HORSES, WITH ESPECIAL REFERENCE TO WINTER CONDITIONS.

By Maurice C. HALL, Ph.D., D.V.M.,
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In a previous paper dealing with horse lice, the writer (Hall, 1917) has noted that the problem of keeping horses free from lice becomes acute during the winter in the Temperate Zones whenever horses are exposed to infestation during part or all of the year. In the same paper some notes on the bionomics of lice were given, and some experiments along the line of control were mentioned, but not discussed. The object of this paper is to give the results of these experiments and some others.

The writer has recently encountered the idea that lice were formerly rather rare on horses in this country. Dr. E. M. Houghton, of this laboratory, states that he never saw them on horses during his boyhood on a farm. I am informed by my father that in all his experience as a cavalryman in the United States Army in Arizona he never saw lice on cavalry horses. On the other hand, the editor of an agricultural paper stated in 1916 that lice were often found on horses and mules in olden times, but are now seldom seen. Whether or not lice were more or less common in this country during the Civil War, and for some time thereafter, they are certainly sufficiently common pests at the present time. Among the horses purchased for the serum work of this company quite a number are found to be infested with lice. The same is true of horses being purchased at the present time for our army, as requests for information as to control measures indicate.

The control of lice in summer is a comparatively simple matter. Two treatments with a coal-tar dip, at 20-day intervals, afford a cheap and adequate treatment without toxic effects on the horse, injury to the skin, or loss of hair. But winter weather is not suitable for this treatment under most conditions. The use of an aqueous solution of any sort chills the animal and increases the likelihood of pneumonia; the dip wets the horse, and wetting causes chilling. At times the objection may be overcome, as it is largely a matter of labour available to dry the animal after treatment. It is feasible to use coal-tar dips in winter, and to protect the animal against subsequent bad effects, where there are only a few animals to handle, or where there is an abundance of available assistance, as is the case in the army under ordinary conditions. The armies of the Allies, according to Haas, have dipped horses in a swim vat throughout the winter, the animals being dried and blanketed in a warm room when it was available, or being blanketed and taken to the stables when no such room was available. Something of the sort has been successfully accomplished under the direction of Dr. R. H. Wilson with the horses on serum production at Parkedale. This is a possible but not always attractive solution of the louse problem; it is not always a feasible solution.

Broadly speaking, insecticides may be applied to horses in one of five ways:—

(1) In aqueous preparations, which will wet the skin.

(2) In volatile preparations, which will evaporate, wetting the skin only transiently and drying quickly.

(3) In fatty or oily preparations, which will oil the skin, but not wet it.

(4) In powders, which will not wet the skin.

(5) In fumes, which will not wet the skin.

A good insecticide should be effective, cheap, easy to apply, cleanly, non-toxic to the animal, noninjurious to the skin, and should not cause depilatory effects.

A discussion of the advantages and disadvantages of the methods given above, and notes on experiments with some of them, are given in the following portion of the paper.

(1) Aqueous preparations, such as coal-tar dips, are very satisfactory forms of treatment in summer, when wetting is not disadvantageous. In winter they must be used for choice on warm days, or in sheltering structures, and the animals should be quickly and thoroughly dried, rubbed down, and blanketed. Failure to provide this care in winter may result in pneumonia. This is the best known and best established method of killing lice on horses, and is the method of choice wherever applicable. Since it is entirely satisfactory in summer and not in winter, eradication dipping in summer may be regarded as the best treatment for lice; this avoids the aggravated effects of lice infestations, and the apparent increase in number, together with the increased difficulties and danger to treatment in winter. With two dippings at suitable intervals (twenty days), dips of this type are satisfactory on practically all of the counts noted as desirable for an insecticide.

(2) Volatile preparations for killing lice are seldom used or recommended, but since they can be used in winter, owing to prompt evaporation, and since so little has been published along this line, the writer made some tests to ascertain at first hand some of the possibilities of such treatments.

Of the volatile substances, two which deserve early consideration as louse-killers are kerosene and gasolene. These substances have proved extremely effective against lice on man, and have been used undiluted with very little resultant dermatitis. They are comparatively cheap and easy to obtain. However, kerosene is inflammable, and is notoriously depilatory and irritant for horses, and gasolene is too inflammable and explosive to use around stables where hay and straw in abundance furnish material for a conflagration. Tests of kerosene mixed with equal parts of linseed oil were made on one horse, No. 2; no live lice were ever found on the horse in examinations during a month after treatment, but the linseed oil did not prevent the depilatory action of the kerosene or the production of dermatitis. A substance which is not depilatory and not explosive, though it is inflammable, is methyl alcohol (wood alcohol). This is known to have lethal and toxic properties, is easily obtained, and is comparatively cheap. It was therefore made the basis of most of the preparations tested.

The first of the methyl alcohol preparations tested was made by adding fluid extract of quassia (*Picrasma excelsa*) to methyl alcohol in the proportion of 3 ounces of the fluid extract to 30 ounces of alcohol, or 1 part to 10 by volume. The horse was sponged twice from head to tail with this preparation, and gone over with a brush each time immediately after sponging. A number of the horses treated in this way had been rubbing, but no lice could be detected on them; others had lice, but were not critically examined after treatment, so that no conclusions as to efficacy could be drawn; but a number of animals found infested with *Hæmatopinus* were treated, and were subsequently examined to ascertain the efficacy of the treatment. Eight horses (Nos. 484, 517, 400, 601, 283, 409, 730, and 471) were treated for lice, though in some cases no lice were detected in spite of a history of the animal's rubbing itself; these animals were not subsequently examined for lice, though casual examination in some cases indicated that the animals' coats were not injured by the treatment. Eight other horses (Nos. 173, 69, 746, 610, 57, 310, 706, and 457) were treated in spite of the fact that no lice were found on them; subsequent examination also failed to detect any lice, so no conclusions as to efficacy could be drawn; the animals' coats were not injured by the treatment. Eight others (Nos. 278, 491, 1,781, 452, 306, 677, 175, and 449) were found to have lice on preliminary examination, and were examined for lice after treatment. The results were as follows:—

Horse No. 278 had many lice. For several days after treatment dead lice were noticed on the animal, and an examination on the ninth day after treatment disclosed only one live louse. Fourteen days after the first treatment a second was given. Thirty-six days after this second treatment the animal was carefully examined, and no live lice were found.

Horse No. 491 had many lice. Nine days after treatment no live lice were found. It was examined again fourteen days after treatment, and no lice were found. The treatment was repeated on this day. It was examined twenty-one and thirty-six days after the second treatment, and no lice found on either occasion.

Horse No. 1,781 had lice. Thirty-eight days after treatment no lice were found.

Horse No. 542 had many lice. Twenty-one days after treatment no lice were found. Thirty-six days after treatment one live louse was found.

Horse No. 306 had many lice. Twenty-one days after treatment one young louse was found. Thirty-six days after treatment none were found.

Horse No. 677 had many lice. It was examined twenty-one days and thirty-six days after treatment, and no lice were found.

Horse No. 175 had lice. It was examined twenty-one and thirty-six days after treatment and no lice found.

Horse No. 449 had lice. It was examined thirty-six days after treatment and no lice found.

Of these eight horses, five had large numbers of lice, and three were lousy enough to make the finding of lice on them before treatment an easy matter. In eleven examinations after treatment no lice were found ; in two examinations, at intervals of twenty-one and thirty-six days after treatment, one louse was found in each case, one of them being evidently a young louse which had hatched subsequently to treatment. This appears to be conclusive evidence that the treatment will kill lice present on the animal. It is possible that the treatment exerts a detrimental effect on the louse eggs, but it is evident that as administered some eggs escape this effect and hatch. Probably two treatments at a twenty-day interval, if properly given, would completely free a horse from lice, so that it may be regarded as a fairly satisfactory control measure for lice in winter where dipping is not feasible.

A second methyl alcohol preparation was made with methyl alcohol as a base and contained 10 per cent. fluid extract of quassia, as in the foregoing preparation, and also 5 per cent. glacial acetic acid, and 1 per cent. coal-tar creosote oil. Two horses, Nos. 339 and 1,218, were treated with this preparation. No lice were found at the time of treatment, or seven or forty days after treatment, so there were no conclusions as to its efficacy, but the treatment had no bad effects on the animals or on the skin or hair.

A third methyl alcohol preparation was made with 20 parts methyl alcohol, 2 parts glacial acetic acid, and 2 parts coal-tar creosote oil. Two horses, Nos. 55 and 396, were treated with this preparation as follows :—

Horse No. 55 had many lice. Seven days after treatment it still had many lice and the coat was roughened. Thirteen days after treatment, it still had many lice, and was then treated with plain methyl alcohol. Twenty-seven days later no lice were found on examination, and the coat was smooth. The methyl alcohol to which other ingredients had been added, as noted, seemed inferior to methyl alcohol alone and exerted an injurious effect on the coat.

Horse No. 396 was examined for lice, but none were found. It was given the same treatment as was given No. 55 the first time; seven days later no lice were found, but the coat was rough. Forty days after treatment no lice were found, and the coat was again smooth. No conclusions as to efficacy in this case.

The mixture used seems to be unsatisfactory as regards efficacy and effect on the coat.

A fourth methyl alcohol preparation was made with 400 parts methyl alcohol, 20 parts glacial acetic acid, and 5 parts coal-tar creosote oil.

Eight horses were treated with this as follows:—

One horse, No. 24, was examined for lice, but none were found. It was given the treatment noted above. Seven days later no lice were found, but the coat was roughened. Forty days later no lice were found, and the coat was smooth.

Seven horses had lice and were treated with the above preparation with the following results:—

Horse No. 709 had lice. Seven days after treatment no live lice were found, but the coat was roughened. Forty days after treatment, one live louse was found; the coat was smooth.

Horse No. 312 had lice. Seven days after treatment no lice were found, but the coat was roughened. Forty days after treatment no lice were found, and the coat was smooth.

Horse No. 303 had lice. Seven days after treatment a young louse and one older louse were found. The coat was roughened. Thirteen days after treatment one young louse was found. About this time the treatment was repeated. Forty days after the first treatment the horse was examined and no lice found; the coat was smooth.

Horse No. 9 had many lice. Seven days after treatment no lice were found. The coat was roughened. Forty days after treatment two lice were found. The coat was smooth.

Horse No. 490 had lice. Seven days after treatment no lice were found. The coat was roughened.

Horse No. 365 had lice. Seven days after treatment no lice were found. The coat was roughened.

Horse No. 1,758 had lice. Seven days after treatment no lice were found. The coat was roughened. Forty days after treatment two lice were found. The coat was again smooth.

In the foregoing tests of this fourth methyl alcohol preparation, six of the seven horses had lice enough to find easily, and the seventh had a heavy infestation. In thirteen examinations after treatment no lice were found in eight examinations; one louse was found in each of two examinations, and two lice were found in each of three examinations. Of the eight lice found after treatment two were evidently young lice, and it is quite possible that some of the other lice had hatched after treatment. The coat was rough a week after treatment and smooth forty days after treatment.

In the cases already noted in this paper, the lice were *hæmatopinus*. *Trichodectes*, as already noted (Hall, 1917), was only found on two horses, in both cases in heavy infestations. The lice were destroyed on one horse, No. 772, as previously published, by the application of sodium fluoride. The other horse, No. 773, was sponged, as described, with methyl alcohol. Fifteen days after treatment no lice were found.

Sponging with methyl alcohol, alone or with the addition of fluid extract of quassia, or of glacial acetic acid and coal-tar creosote oil, is a fairly effective control measure for lice on horses in winter. It must be applied thoroughly and carefully, but if so applied it is likely that two treatments at a suitable interval, twenty days, would completely free a horse from sucking or biting lice. The methyl alcohol is somewhat unpleasant to handle, and the fact that it is inflammable must be kept in mind.

(*To be continued.*)

Clinical Cases.

By Henry B. Eve, M.R.C.V.S.,
Folkestone.

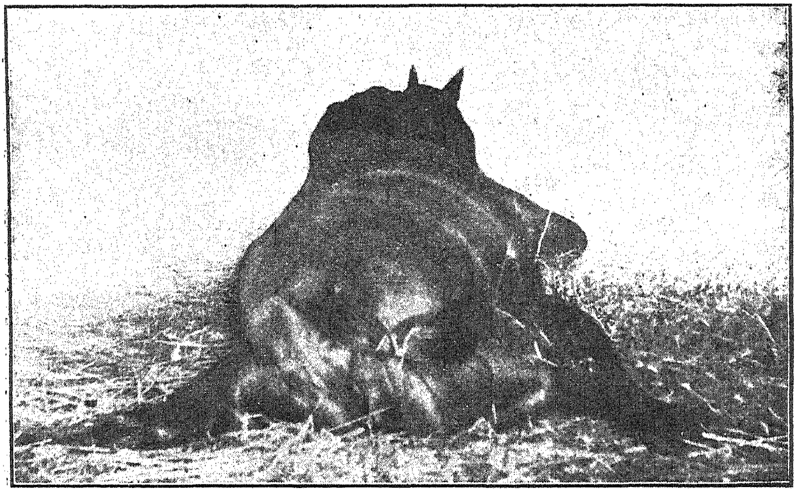
NOTES OF A CASE OF LACERATION OF THE SACRO-ILIAC ARTICULATION IN THE MARE.

The above case occurred in my practice some time ago, which shows the peculiar characteristic recumbent posture. I found the animal on arrival dead.

The history of the case is that it had arrived all right by train overnight, unloaded here, and was put into a loose box to be fed and watered, previous to being shipped to France. Nothing was noticed amiss with it by the attendant; when he found it dead, to his surprise.

I had it photographed and made a *post-mortem*, which revealed the fact that it suffered from aneurism of the post aorta, which had ruptured and caused death.

Having seen the diagram of Capt. H. R. Routledge's, F.R.C.V.S., interesting cow case in journal reminded me of the occurrence. I remember a similar case in a cow appeared illustrated in "Record"



ANEURISM POST AORTA.
Rupture of Post Aorta, cause of death—*P.M.*, see *Record.*
Luxation of the Sacro-Iliac Articulation in the Brood Mare.

by Henry Taylor, F.R.C.V.S., Haywards Heath, September 14th, 1912. I sent the latter a photograph of my case, and he gave me one of his cow in return, and we exchanged notes on the cases.

AMPUTATION OF THE TAIL.

Subject.—A Great Dane, the property of an officer on active service, which suffered frequently from a sore at the tip of the tail which defied all antiseptic treatment with lotions and various dressings as a result of the coccygeal bones being diseased, so tried amputation.

History.—The bitch I knew as a pup, having attended the mother at pupping, which also suffered from the same complaint, which is difficult to treat in my experience, and indicates that the disease is apparently "hereditary." The owner had tried various dressings—"Zambuk," declared by some a specific. It always healed up for a time, and then broke out again; the dog continually licked the parts, bit them raw, and banged its tail against furniture, doors and kennel (padded with sawdust).

Diagnosis.—Bones (coccygeal) diseased; advised amputation; owner wished treatment to be tried first, and was very persevering and patient; but consented finally to the operation, which would spoil her appearance, and render her liable to disqualification at shows.

Treatment.—I cleansed the wound with chinosol solution, and dusted over iodoform, starch, boric acid, and zinc oxide; covered sore with gauze and bandage applied, which was kept on with difficulty, although I applied several layers of Mead's plaster over the end of tail to prevent further bruising. I also ensheathed the tail in a case of leather, which was fastened round the loins. It healed again and again, and always broke out, so I decided to try amputation.

Operation.—I applied (locally) cocaine with adrenalin and boric acid (Parke, Davis & Co. tablets dissolved); ligatured and amputated (with horse-docking machine) at the joint above disease, and seared the dock well with hot irons, which I had to do to control the "hæmorrhage" which was somewhat extensive, the patient apparently being a hæmophilia subject, and very neurotic ever since the air raids. Locally, adrenalin strong solution did not appear to have any effect at all, or ferri. perchlor, so I kept a ligature on (elastic tourniquet) above the seat of operation for some time, and finally removed this and applied iodoform colloid. To prevent her antics, I put on an Elizabethan collar and leather case, which answered well. The bitch has recovered, (wound healed by primary union), and bears me no malice. In addition to the collar, etc., I tied her to the centre of a rope, placed across the bedroom where she was quartered, allowing rope enough to lie down without being able to reach the hind quarters, which was necessary.

EPILEPSY CAUSED BY PARASITIC CYSTS IN THE BRAIN OF A DOG.

Subject.—Samoyede dog, two years old.

History.—The animal had suffered periodically from epileptic fits, which made the owner suspect either "rabies or poison," as it had been dosed several times for worms, and had been declared by a graduate free from them. The dog was in the habit of carrying stones in its mouth, which the owner said he could not break it of unless it always wore a muzzle. The dog had recovered from distemper, twelve months previously and had been attended by a V.S.

Symptoms.—I observed the animal moved in a happy-go-lucky, clumsy sort of fashion, and showed symptoms of "hemiplegia" on the right side. It had a fit in my surgery, and the usual paroxysms were manifest, accompanied by foaming at the mouth, etc.

Prognosis.—Unfavourable.

Diagnosis.—Perhaps epilepsy, due to reflex irritation caused by foreign body in the stomach, or worms, or "cysts in the brain."

Treatment.—Gave hypo. inj. apomorphine as an emetic, which acted quickly, and a mass of debris, composed of bones and matted hair, was vomited. Gave internally bromide compound (elixir) (Parke, Davis & Co.) pot. bromid., chloral hydras. and ext. cannabis indica and ext. hyoscyamus, as a sedative and suitable diet of a liquid nature, which relieved the animal temporarily. Put the dog later on a diet of raw meat minced and tripe, and administered a tonic of hydrated iron 1 gr., and arsenic 1-30th gr. in food; sent little antileptic pills, tinc. valerianate 1 gr.; zinc. bromide ¼ gr., arsenic bromide ¼ gr., to be given periodically as a preventive of fits.

Remarks.—Dog discharged from infirmary, brought back as a result of a street accident (run over by motor, and severely injured), paralysed. Advised destroyal, to which the owner consented. I made a post-mortem, which was interesting.

Result.—No fracture anywhere present, but a "cyst" was found in the anterior lobe of the brain, and several others of small dimensions in the brain substance, and on its lower surface. These all had the characteristic appearance of the cysts of the "taenia cellulosa" variety of man.

General Articles.

AN EAST COAST FEVER EPISODE.

By "H."

It was in March, 1916, that I first became acquainted with East Coast Fever. It was in this wise: There were two of us, "H. K." and myself, and our immediate object in life was to get a mob of about 500 cattle up to German East Africa, where they were to serve as food for General Northey's force. We had left Fort Jameson, in Northern Rhodesia, towards the end of February, crossed into Nyasaland to avoid the huge "fly-belts" that constitute the greater part of the former country, and were making our way northwards. During the first three weeks our journey was made under favourable conditions, despite the fact that it was in the rainy season. Our way lay through pleasant bush country, sparsely populated by natives, and, save for rare administrative "bomas," mission stations, and hunters' camps, altogether uninhabited by white men.

Our journeying was done thus: Breaking camp by starlight, we were on the road before the sun appeared. "H. K." and I would walk on ahead, preceded by a guide, and attended by our gun-boys. Some distance behind would trail our porters, fifty of them, carrying on their heads the equipment and provisions necessary for a three months' sojourn away from stores. Behind these, again, and travelling yet slower, came the cattle. The first mob was composed of big bullocks ; the smaller and weaker animals following in lots of a hundred strong. As we walked along we would pause from time to time to fill in with our sticks any deep, narrow hole on the path—such as are caused by termites devouring tree-roots—that was likely to cause lameness should an ox be forced to put his foot into it.

We used to try and arrange to cover about 10 miles a day, and as it was the rainy season we were generally able to accomplish our desire. Had we been travelling in the dry season we should have been forced to put in some very much longer treks between the water holes. About 9 a.m., then, we would begin to look out for a camping place. The desiderata were good water accessible to cattle, good grass and a sufficiency of small trees for kraal building. Having selected a site for our camp, we would possess our souls in patience until our porters arrived. We would then mark out the sites for our tents and kraals. The latter were made on a sloping ground to allow for drainage, and were laid out on the plan of a rectangle divided into as many compartments as there were mobs. To make them, our porters, having deposited their loads, would cut and insert forked poles to serve as posts, across which they would lay and bind thin poles. The lashings were made from the inner bark of certain species of trees. Against the fence thus formed were piled all the branches lopped off from the poles. Our tents were pitched on the top side of the kraals, and the boys were then set to build themselves grass shelters at intervals round the other three sides. By the time the camp was completed the cattle would have arrived, and we would have pointed out to the herd-boys the most suitable grazing-grounds. Thus it was usually after eleven o'clock before we sat down to breakfast. After that meal we would lounge and read, or perhaps fill in time by walking to where some of the cattle were grazing, until 3 o'clock tea was served. As a rule, after that, one of us would go out with rifle or gun, while the other would stay behind to count the cattle into their kraals at sunset. A hot bath followed by dinner left only a short time for smoking before drowsiness suggested bed. Rarely were our slumbers disturbed by anything more menacing than the usual sounds of restless cattle, but, as there are always lions somewhere in the vicinity of cattle travelling through Central Africa, we kept fires burning throughout the night, if possible, and our rifles lay near our bedsides.

Travelling about six days a week, and, when a particularly favourable place was reached, resting the cattle on the seventh, we pursued the even tenor of our way for about 250 miles. Then our troubles began. We had now entered a district densely populated by natives so that it was very difficult to find any camping-place away from ground soiled by herds of native cattle. If we were to get our charges, safely through to their destination it was essential that we kept away from indigenous herds; because throughout the whole of Northern Nyasaland East Coast Fever is enzootic, and our cattle were susceptible to this disease.

When East Coast Fever is enzootic in a district the situation is this: All the adult cattle one sees are immune to the disease, but each young calf must sooner or later—depending on the tick population—go through an attack. The majority of calves survive, though perhaps 20 per cent. die. All these sick calves act as reservoirs of the virus and serve to infect more ticks; consequently clean, non-immune cattle passing through the district are in grave danger of picking up infective ticks, and the mortality among such infected cattle is nearly 100 per cent.

We did our best, but nevertheless our apprehension grew. Then came the day when we reached the Rukuru River, and found it impassable for stock. We cast about and camped at a spot as far away from villages as we could find, but 500 head require a lot of veldt to graze over, and we knew they must of necessity encroach on infected land. Meanwhile we set to work to bridge the river. We found a spot where it ran between great ranges of hills, flowing very fast and deep. A great boulder lay in its centre, and already the natives had thrown a slight pole bridge across the two channels. It took us two days to strengthen this structure sufficiently for it to bear the weight we were about to impose on it, and we bounded it with leafy rails to hide the water from the sight of the animals while they were crossing. Then, one Sunday morning, we essayed to get the cattle across.

To get to the bridge one had to proceed along a narrow path that wound through the hills, but by this time the cattle would travel quietly in single file, each mob having one or more adventurous leaders that were always ready to go ahead. Where the path debouched on to the bridge-head the noise of the waters was deafening and calculated to frighten any beast. We had with us an old white donkey, a great traveller, and fearful of no obstacle; him we had led at the head of the first mob, because we knew he would venture across, and we hoped the cattle would follow the lead thus set. Even if the animals crossed the bridge itself there were other physical difficulties to be contended with. The path leading to the bridge was bad, but that going from it was worse. In the first place the bridge led on to a large, flat rock, and the commencement of the path was two feet above this; to attain it one had to step or leap on to a large boulder. We had arranged that "H. K." should supervise the getting of the cattle on to the bridge, while my task was to be that of getting them on to the path on the other side.

At last the old donkey, led by a boy, appeared, and close behind him came the first of the oxen, sniffing his way cautiously along. The donkey gave no trouble at all, but walked straight on to the bridge, and to our relief the leading ox hesitated but a minute before following. After the leader came some others, and soon the flat rock on the far side was covered by a mass of beasts, for, though "H. K." had succeeded in his task, I had failed in mine, and, despite the gallant lead set by the donkey, the oxen jibbed at the boulder, refusing to jump on it, and turned back to mingle with those still crowding across. We were naturally frightened that if once we stopped the stream of cattle that was pouring across the bridge we should have a job to restart it, so I redoubled my efforts, using my sjambok mercilessly; but all in vain, and I shouted and gesticulated until "H. K." took notice, and blasphemously stopped more cattle coming on to the bridge. He then came across, and our united efforts at last succeeded in persuading one beast, soon followed by others, to jump on to the boulder. After that the interrupted stream of cattle was again set in motion without much trouble, and two hours later all were safely across.

For about a mile beyond the boulder the path ran its narrow course alongside the hill that bounded the river, in many places there being a sheer drop of about 30 feet into the rushing water below. Along this path the cattle travelled in single file, and fortunately none stopped or tried to turn back; if they had, those coming behind would have mobbed, and some weak ones would have gone over the edge. As it was, one animal did fall over the brink, and perished in the water. The natives have some superstition to the effect that the spirit of the place demands a gift of all who go by, and I believe they thought that the drowned ox was the sacrifice claimed by the spirit for our passsage.

As we counted the cattle into their kraals that night we imagined that the worst of our troubles were over, and calculated that in a month's time we should have delivered our charge. For the moment we forgot about East Coast Fever, and made plans for travelling slowly, in order to preserve the animals in the splendid condition that they were then in.

The greater part of Nyasaland north of the Rukuru is a great plateau, called the Nyika. It is a country of rounded hills, grass-clad, and intersected by numerous swift-flowing streams. The average height of the plateau is, I suppose, somewhere about 6,000 feet, although some of the hills attain a considerably greater altitude.

The usual route for travellers taking the journey we contemplated is along the path through the strip of Nyasaland that lies west of the plateau, between it and Rhodesia. A week's travel along this path would have brought us to a point on the border of the two countries that lie north of the great fly-belts, and we could then have crossed into Rhodesia and been only 150 miles from our destination. On the day following our crossing we advanced into the foot-hills on the south side of the plateau, and came on a place eminently suitable for a short stay. There was an abundance of grass and water, and the buffalo spoor in the native gardens gave promise of sport for ourselves, so we decided to remain a day.

Next morning the cattle as they came out to feed looked splendid, without a sick-looking beast among them. Three hours later, while we were breakfasting, a herd-boy came to say that an animal was ill, and he brought us to a half-grown ox that stood dully, not attempting to feed. It had a high temperature, and a noticeable feature was a swelling under an ear due to enlargement of one subparotideal lymphatic gland. This lesion is a common, but by no means invariable, one in cattle affected with East Coast Fever. By night the beast was destroyed when *in extremis*, and a gland smear taken. The following morning two more oxen lay dead in the kraals when the others came out, and a third was sick. Microscopical examination of stained gland smears showed, in each instance, numerous Koch's bodies, and the disease stood revealed as East Coast Fever.

We had now to consider what was our best course. We were uncertain whether we were still in a district where the disease was enzootic; but, whether we were or were not, one thing was certain—we must not go anywhere near native cattle from now onwards, lest these, being clean, were infected by our diseased animals, or, being infected, they infected still more of ours. We had not the slightest notion how many of ours were now incubating the disease; perhaps but a few, perhaps the lot. Knowledge of the etiology of the disease suggested that if we got on to clean veldt, and changed our grazing ground every week, no more cattle could become infected, and those that were incubating the disease would show it within three weeks.

The route spoken of above was now closed to us, because of the native cattle along it, and the only veldt available where we could fulfil the conditions necessary for cleansing the herd was the plateau itself. Next day we started to climb on to it—1,000 feet up, then 500 down, then up another 1,000, and so on. Two strenuous days brought us to the top, and the cattle must have lost a good deal of weight from the climb. During these two days three or four more animals died or were destroyed.

Now commenced three miserable weeks. Each evening, whether we had been travelling or halted during the day, when the cattle came in at night we would ask the guards how many more were ill, and inevitably a few beasts would be pointed out as off feed. Any beast obviously ill, and having a high temperature in the morning, was destroyed. I say "high temperature in the morning" because in the tropics the temperature of a *healthy* ox may exceed 105 in the evening of a hot day, owing, I suppose, to the inability of bovines to sweat freely. On the days when we travelled I would walk behind the last herd, armed with a native axe wherewith to destroy any poor beast that fell by the wayside, for not infrequently a beast would leave its kraal apparently fit and yet, three hours later, refuse or be unable to climb a small hill. It was a heartrending business.

The country was cold, wet, and desolate. Our boys were complaining that their exclusive diet of meat and green mealies disagreed with them; several were ill with fever, and almost all suffered from a loathsome skin disease. A favourite dog contracted biliary fever and died. Even the old donkey, after fifteen years' residence in the tropics, sickened almost to the point of death.

It was during this stage of the journey that I witnessed one of those incidents that make us realise how little we understand the native. The African negro has the disposition of an unlovable child, that at the best inspires in his master a sort of pitying affection; nevertheless one day I saw our chief herd-boy on his own initiative pick up a poor, sick fellow who was toiling painfully up a steep hill, and carry him to the summit.

The physical difficulties to be overcome were not trifling, rivers especially being a nuisance. Either they would be fordable, but with banks so sticky that the cattle became bogged, or else they would flow too fast for the animals either to wade or swim through, and we should have to build bridges. It is not often that I have felt as "fed up" as I was one night. We were in a particularly sterile part of the plateau, where the grass was of the sourest. We had been held up by a river of which the banks were so steep that the cattle were unable to water at it, but had to drink at rain pools. We had spent the afternoon putting up a bridge; a very rough affair, for by now the cattle would walk across a few poles, provided these would bear their weight. That night, as the cattle came in, there were about eight sick, and, as we were leaving next day, we killed them and left their carcases lying close to the kraals. The country being very sparsely inhabited, there were no local natives to devour this good beef; it just lay and rotted. Well, on this particular occasion we were no sooner settled for the night than it commenced to rain. I have said that the district was a sterile one; accordingly our boys were ill provided with grass shelters, and we knew the poor beggars were lying or sitting around embers that were being quickly quenched. The thought of the plight of our poor followers would have been sufficient to keep me awake during that wretched night, but a further cause of unrest was furnished by a dose of fever—one of those sub-acute attacks that do not actually incapacitate a man, but that make him feel wretched and depressed, with a hot, dry skin. As I lay awake, listening to the pitiless beating of the rain on my tent, I remember thinking that the only thing necessary to complete our discomfort was the stampeding of the cattle by a lion. However, no such catastrophe occurred; morning dawned clear and beautiful, and the sun's rays soon dissipated moisture and depression.

It was just a fortnight after our climb on to the plateau that the daily death rate became highest, showing that it was while we were held up by the Rukuru that the greatest number of cattle became infected. Since the first beast died we had lost nearly 150 head, the worst day being one when I killed forty animals, including many big, half-bred oxen. The incubation period for East Coast Fever is twelve to twenty days, so when we had been on clean veldt three weeks the animals ceased to go down, and unless there were among them a few of those rare cases in which the incubation period lengthens out to several weeks, we felt that we had now a clean herd.

Our path during this time had taken us in a north-westerly direction across the plateau, so that we could now almost look down on to Rhodesia. Of course, after recent events, we could only cross the border with the consent of the C.V.S. of that country, so it was necessary to put the cattle in quarantine on the border until such permission could be obtained.

Of the further trials that befell us—as when, for instance we reached the actual border only to find an unexpected fly-belt there; unable to cross the border on account of restrictions; unable to go back on account of the East Coast Fever; and unable to stay where we were on account of tsetse fly—they would make too long a story to be told now.

ARMY VETERINARY SERVICE.

THE ECONOMIC AND MILITARY NECESSITY OF AN ARMY VETERINARY SERVICE.*

COLONEL J. J. AITKEN,

British Army Veterinary Corps, Washington, D.C.

SINCE the United States ran her battle-flag alongside those of the great civilised nations to the masthead of the battle-ship "HUMANITY," with the sworn object of fighting and exterminating that lawless, piratical craft "BARBARISM," manned by those followers of Attila, the Central Empires—since that day the subject that has been uppermost in my mind, and doubtless also in the minds of many, if not all of you, has been, How can the profession we have the honour to represent do best service in this great crusade of to-day ?

This crusade, as it has developed in magnitude, has shown itself to be one that calls for the very last ounce of organisation and of physical and mental energy.

In the fighting zones, in all its activities it is a war of trained experts, working in perfect co-ordination. This we know from personal experience, from the reports of eye witnesses, or from the Press.

The veterinary profession in this great land of freedom, at this critical moment of its history, can be of most use to its country in producing an organised veterinary service as part of the U.S. Army.

Such a service, to be effective, will require to be as much a part of the army as are now cavalry, artillery, and infantry ; a trained disciplined service of officers and enlisted men organised into veterinary units of various kinds with specific duties to perform. The necessity for an organised veterinary service in an army of to-day is two-fold. There is an economic necessity and there is a military necessity. This great crusade is using up so much of this world's wealth and material that the old slogan of "The Best and the Most at any Cost" has been superseded by "The Best and the Le t Necessary at the Smallest Cost." We must not forget that all of us who rally round the old cry, "Be it by ourselves wasting, encouraging waste in others, or even not preventing, to the best of our ability, waste of foodstuffs, raw material, transportation or horseflesh, are materially assisting the common enemy." The economic necessity of a veterinary service as part of an army of to-day lies in the fact that it is only by the existence of such an organised, centrally controlled service that commanding officers of combatant units can have placed

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*Read at the 10th Veterinary Conference, Ithaca, D.Y., January 11th, 1918. (From the *Journal of the American Veterinary Association.*)

at their disposal, as advisers on all matters affecting the health of the animals of their units, capable veterinarians, working under an organised, co-ordinated system. Without such advisers, economy in horseflesh cannot exist. This will be patent to all if they will consider for one moment the multiplicity of duties of the combatant officers of to-day and the limited knowledge of horseflesh that many newly-commissioned officers possess.

It is only by an organised veterinary service that faults in animal management, common even to-day and to become increasingly common as men less and less acquainted with animal management are necessarily drafted into mounted branches, can be brought to the knowledge of the headquarters of formations, armies or the war department in time to prevent serious results; it is only by such a service that co-ordinated steps can be taken to rectify such faults.

Without such a service delay in diagnosing, in reporting, above all delay in taking co-ordinated and organised steps to control and eradicate equine contagious disease must result, with appalling loss of efficiency, waste of public money, labour and material. Without such a service the expensive treatment of sick, lame and injured animals haphazardly, without proper appliances and with an untrained staff in their own lines or in hopelessly situated, equally hopelessly equipped so-called veterinary hospitals, must continue to exist. With such a service, however, all but the most minor cases can be treated in bulk, by the thousands instead of by tens and hundreds, in large, well-built, properly-ventilated, properly-situated, thoroughly equipped and efficiently staffed veterinary hospitals.

It does not require much considering to realise that in such hospitals it is possible to provide specialists, appliances, trained staffs, and a system that it is utterly impossible to provide for hundreds of small so-called hospitals that exist when no organised veterinary service is in being, nor is it difficult to realise that one system is criminally wasteful and the other economical.

Without such a service co-ordinated steps cannot be taken to collect eports and obtain information on the hundred-and-one matters affecting animal health in a military service, nor to investigate outbreaks of disease and the frequency of injuries affecting animal efficiency. Without such a service scientific investigation and experimental work with a view to eradicating harmful courses must be inco-ordinate and wasteful.

Without such a service no efficient control can be exercised over young and inexperienced veterinarians; no adequate support can be given to those veterinarians who, in the performance of their duties, find difficulties placed in their way. No system of praise for the silent, conscientious hard worker, blame for the bluffer, and elimination of the vicious, the ignorant and the pseudo-veterinarian, can be created.

The reasons I have just outlined to you showing the necessity for an organised veterinary service all have an economic "*raison d'être.*" In that they affect efficiency, however, they are also military reasons. There are also a few purely military reasons that show the necessity for an organised veterinary service in an army of to-day. The efficiency of a mobile unit depends largely on the efficiency of its means of mobility, be such the men's feet, the mule, the horse or the engine-driven car. An organised veterinary service can materially assist military efficiency by removing, with the least loss of the fighting strength of a unit, all animals that retard mobility, either by their inability to move at a normal pace or by their presence on the feeding strength of a unit when in an unworkable condition, a presence that is a high factor of inefficiency in that it is a cause of great loss of ton-mileage on already congested lines of communications often far up into the zone of operation.

The fact that all sick, lame and injured animals, excepting those suffering from disease and injury of the most trivial character, must be at once removed from units in the zone of operation is self-evident. Further, no one will dispute the fact that officers and men must be detailed to look after and restore to usefulness at the earliest possible moment these temporarily, from a military point of view, useless animals—to attend on them from the moment they become useless, be it from a shell wound sustained in the actual firing line, a kick sustained in the wagon line, or disease or injury acquired in any way. What branches of the service can look after these animals with the least waste of fighting efficiency? The officers and enlisted men of corps and units on whose expert training as cavalrymen, artillerymen, machine-gunners, mine-layers, bombers, bayonet fighters, medical students and quartermasters, time, labour and money have been expended? No, they are wanted and wanted badly at their own duties, not wanted for a few hours a day or for a few days a week, but all day and all the week.

These duties can only be performed economically and with least loss to the fighting efficiency of the army by an adequate military veterinary service, organised as a trained and disciplined entity, officered by its own officers, ranking according to the appointments they are elected to fill, with grades equivalent to those of the holders of similar appointments in other branches of the army. A service with one object and one object only in front of it, "EFFICIENCY."

Translation.

MAL-DE-CADERAS.

EMETIC FOR THE TREATMENT OF DERRENGADERA (MAL-DE-CADERAS). FIRST INVESTIGATIONS—DOSIFICATION—PRELIMINARY TESTS—APPLICATION ON A LARGE SCALE.—(*Medical Gazette of Caracas*, March 31st, 1918 ; No. 6. Works executed at the Laboratory of Doctor Juan Iturbe.)

THE favourable results obtained by Van Saceghem (1915) by application of emetic on bovine species attacked with Trypanosoma cazalboui and the surprising effect of the same medicament in the cure of cutaneous and visceral leishmaniosis, has induced us to test the action of monatartrate acid of antimony and potash in the trypanosomiasis of the equine family known in the plains of Venezuela as derrengadera.

The virus we use in our applications was taken at the end of the year 1915 from infected horses of the plains which were brought to the " Jabillal " pasture of the outskirts of Cagua.

During the time elapsing from that date we have been able by successive injections to the animals at the laboratory to obtain a trypanosoma of a standard virulence ; an intraperitoneal injection causes death of the guinea pig in ten days. In our experiments we have only made applications on animals which presented a great quantity of trypanosomes in the peripheral circulation.

By the dose of 4 to 5 mm. in the kilogram, the emetic intramuscularly or intravenously injected causes the disappearance of the trypanosomes contained in the blood in fifteen minutes. This action, really specific, was uniform on all the animals that were experimented on ; notwithstanding the repeated hematological examinations we were unable to discover, during the days following the time of the injection of the sterilising dose, any example of the flagellates. The blood of the guinea pig, treated by the emetic, inoculated to another receptive animal a week subsequent to when the first injection was applied, does not contaminate the sickness ; on certain occasions, however, on the third or fourth week from when the emetic was administered, relapses have been observed which yield to a new injection of the medicament. In case the reaction is serious and the bacteriological examination reveals a great amount of parasites, the dose should be increased ; it is well to remember that there exists a chemical relation between the medicine and the causal agent of the disease.

The animals of the laboratory support well the subcutaneous or intravenous injections of antimonio. By our tests an accident has never occurred that could be attributed to the compound.

It must be admitted that whereas none of the trypanosomes of the peripheral circulation escape the chemo-therapeutic action of the emetic there remain, however, parasites in the depth of the tissues that are not affected by this substance. To avoid reactions and obtain positive results it is necessary to effect several injections in order to carry off the fractional sterilisation as is done for the other sicknesses caused by protozoa.

The technical measures adopted for the compound of the emetic was that which on an occasion had already been recommended: Iturbe and Gonzalez (1917). The sterilisation is applied cold by passing through a Berkefeld filter.

The emetic used in our studies is that of the house of Baiss Bros., London, or Merck, of Darmstadt.

In view of the experimental results referred to, we endeavoured to effect tests on the equine animals attacked by the sickness; with this object, and aided by the intelligent co-operation of our distinguished colleagues, Messrs. Tagliaferro and Nuñez Tovar, five horses and two mules were injected on different occasions which had the typical symptoms of that sickness and presented a large quantity of trypanosomes in the peripheral circulation.

The dose used was 1 to 1·50 grams of emetic disolved in 100 *c.c.* of chloride solution at 4 per 1,000 in intravenous injections.

All the animals submitted to this treatment are completely cured, and the injection was given at regular intervals of five days without accidents occurring. Tagliaferro and Nuñez Tovar have been able to apply the solution concentrated at 1 : 40 without any disagreeable accident and with excellent therapeutic results.

At present injections are being given on a large scale, and a place has been founded where the infected animals are submitted to a cure by the emetic.

It is our opinion that this procedure, simple in its technicalities, and which is giving such efficient results, whilst contributing to save a considerable number of the equine animals annually affected by derrangadera, will do away with the losses which our breeders have suffered.

REFERENCES.

Iturbe and Gonzalez (1917).—First case of Leishmaniosis cutanea in Venezuela (*Journal of Parasitology*, September, 1917; Vol. IV, pp. 44–47).

Van Saceghem (1915).—Contribution a l'étude et au traitement des trypanosomiases. (Ministére Colonies de Belgique, Raport 1915.)—*Nuevo Diario*, Venezuela.

Correspondence.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—Some time ago you were good enough to publish in THE VETERINARY JOURNAL (July, 1916) a short note by me on "Coital or Vesicular exanthema in the Horse," in the subsequent September number Captain R. C. G. Hancock, B.Sc., A.V.C., contributed corroborative evidence of his experience of the disease.

Since then I have had further opportunity of observing the disease, which appears of less rare occurrence in Great Britain than one imagines by the slight reference to it which one finds in most modern text-books. The following brief outlines of a small outbreak, which occurred in my practice since 1916, may be of interest. Stallion A, which had not been previously used at stud before this season was seen to be affected. The horse had fifteen typical ulcers on one lateral surface of the penis, twelve on the other side, and a large, irregularly-shaped ulcer on the ventral surface; there were three typical ulcers on the prepuce.

A dose of aloes and calomel in the form of a ball and the daily washing of the parts with Eusol for a week was prescribed; subsequently, a solution of corrosive sublimate 1 in 3,000 was substituted for the Eusol. A mare with a healthy foal at foot, the property of another farmer residing in another parish, was found to be affected to a marked degree.

This mare had been served eight days previously by Stallion A and probably had been affected at least three days prior to the eighth day after service, because she and the foal were out at grass and they were not seen at a short distance by the owner or his men until the eighth day. Stallion B, two years old, purchased six days after the commencement of the treatment of Stallion A, from a farmer nearly 20 miles distant, deputised on part of the round of Stallion A. Stallion B did not serve the previously-mentioned diseased mare with foal at foot. Twelve days after the date of purchase Stallion B was found to have typical ulcers on his penis and prepuce. I ought to add this horse had not served a mare prior to date of purchase.

The question arises, was the disease conveyed by mediate or immediate contagion?

If by mediate contagion, did the owner of the stallions, who is also the stallion leader, convey the virus (?) to the younger horse through the medium of his hands during the act of serving a mare, the man having previously dressed the older horse's penis and prepuce.

On the other hand, is it feasible, in the present light of our slight knowledge of the etiology of the disease for us to presume stallion B contracted the disease from a mare which was apparently healthy?

The undoubted occurrence of this disease from time to time, at varying intervals in the county of Suffolk, is beginning to cause uneasiness in the minds of some local breeders; one influential breeder in this county views the disease gravely, and he goes as far as to suggest to me that drastic measures should be enacted under Mr. Prothero's Horse Breeding Bill, one of which would make notification of the existence of the disease compulsory by owners and veterinary surgeons.

Although the disease is usually benign in its course, and amenable to simple treatment, nevertheless, when an outbreak occurs at any time prior to the last week of a horse's round, it causes some dislocation of the horse breeding business in that particular district.—I am, Yours faithfully,

HORACE L. ROBERTS, F.R.C.V.S.

Ipswich, June, 1918.

ARMY VETERINARY SERVICE.

War Office, June 3.

The King has been graciously pleased, on the occasion of His Majesty's Birthday, to give directions for the following promotions in and appointments of the Most Distinguished Order of St. Michael and Saint George for services rendered in connection with the War. (Dated 3rd June, 1918):—

To be Additional Members of the Third Class, or Companions, of the said Most Distinguished Order:—

Temp. Lt.-Col. Herbert Watkins Pitchford; Lt.-Col. (temp. Col.) George Mostyn Williams; Maj. (temp. Lt.-Col.) Frank Shelston Headon Baldrey, F.R.C.V.S., Ret. pay.; Temp. Major, Jos. Wm. Forster Brittlebank.

CANADIAN A.V.C.—Lt.-Col. Charles McEachran.

Rewards for valuable services rendered in connection with the War. (Dated June 3rd):—

TO BE BREVET LIEUT.-COLONEL.

Maj. (temp. Lt.-Col.) E. Brown, D.S.O.

TO BE BREVET MAJOR.

Capt. (temp. Lt.-Col.) E. E. Bennett, Ret. list (late A.V. Dept.); Capt. (actg. Maj.) A. B. Mattinson, M.C., F.R.C.V.S., Spec. Res.; Capt. E. E. Seldon.

THE MOST DISTINGUISHED ORDER OF ST. MICHAEL AND ST. GEORGE.

For services rendered in connection with Military Operations in France and Flanders. (Dated June 3):—

To be additional Members of the Third Class, or Companions of the said Most Distinguished Order:—

Temp. Maj. Fredk. Thomas George Hobday, F.R.C.V.S.

TO BE BREVET LIEUT.-COLONEL.

Maj. (actg. Lieut.-Col.) W. H. Nicol; Major E. J. Wadley, D.S.O.

THE DISTINGUISHED SERVICE ORDER.

Temp. Capt. (temp. Maj.) F. C. Gavin; Maj. H. J. Holness; Maj. J. R. Steevenson.

CANADIAN A.V.C.—Maj. (temp. Lt.-Col.) A. B. Cutcliffe; Maj. (Lt.-Col.) C. E. Edgett; Maj. C. G. Saunders.

AUSTRALIAN A.V.C.—Maj. G. G. Heslop.

THE MILITARY CROSS.

Capt. (temp. Maj.) T. Bone; Capt. (temp. Maj.) A. L. Horner; Capt. D. Keir; Temp. Capt. W. Lenton.

CANADIAN A.V.C.—Capt. M. P. Kennedy.

AUSTRALIAN A.V.C.—Capt. C. R. Seelenmeyer.

For distinguished service in connection with Military Operations in Egypt. (Dated 3rd June):—

THE DISTINGUISHED SERVICE ORDER.

Capt. (temp. Maj.) Harry Edwin Powell; Capt. (temp. Lt.-Col.) Percy James Simpson, F.R.C.V.S.; Capt. (actg. Maj.) Sidney Joseph Williams.

THE MILITARY CROSS.

Capt. Chas. Holland; Capt. (temp. Maj.) W. Stephenson Lornie; Temp. Capt. (act. Maj.) R. Wallace Simpson.

For distinguished service in connection with Military Operations in Italy. (Dated 3rd June):—

THE MILITARY CROSS.

Temp. Capt. Robert Carr Allinson.

THE MERITORIOUS SERVICE MEDAL.

Pte. (actg. Sergt.) A. J. Wise, SE 7334 (London).

For distinguished service in connection with Military Operations in Salonika. (Dated 3rd June):—

TO BE BREVET LIEUT.-COLONEL.

Maj. P. J. Harris.

THE DISTINGUISHED SERVICE ORDER.

Capt. (actg. Maj.) John Rae, Spec. Res.

THE MILITARY CROSS.

Temp. Capt. Ernest James Burndred; Capt. John Arthur Fearnside.

Obituary.

PROFESSOR LIAUTARD.

ONE of the most persevering pioneers of Veterinary Science, whose name and work will be very much missed, has passed away at the ripe old age of 84. As with England, so with our other English-speaking ally, America, the foundation of veterinary colleges owes its inception to the persevering energy of a Frenchman, for Liautard has been to America what St. Bede was to Great Britain. A graduate of the famous Alfort School in 1856, Liautard crossed over to America and settled in New York, where he became Dean of the New York College of Veterinary Surgeons, studying human medicine at the same time at the University in that City, and graduating as a doctor in 1865.

It was largely owing to his efforts that the American Veterinary

Medical Association was started, as he was one of the original founders, and it is owing to this association that the veterinary profession in America holds the position it does to-day. Dr. Liautard was its first secretary and was unanimously elected President on numerous occasions. No man was more respected, and no opinions carried more weight, for it was always known and felt that whatever he brought forward had been always well thought out beforehand, and would be for the advancement of the profession. The "advancement of the profession" was the motto he always worked up to, and it was really astonishing to his British colleagues how his influence was felt in America during the later years of his life when he had returned to his beloved France to the retirement and rest he had so well earned. The loyalty of his American colleagues spoke volumes for his character and the high opinion in which he was held, and this was especially shown in the co-operation of the editorial staff of the *American Veterinary Review* (now known as the *Journal of the American Veterinary Medical Association*) with Liautard as Chief Editor, a position accorded to him for nearly fifty years. His old students speak of him as a wonderful teacher, one who could impress them in a way which they did not easily forget, and his enthusiasm was communicated to all with whom he came in contact. The text books emanating from his pen were always of a practical nature, all unnecessary padding being remarkable by its absence, whilst his knowledge of several languages enabled him to draw upon the work of scientists in France and Germany, and so be up-to-date. His foreign honours included the Chevalier du Merite Agricole of France and the Honorary Associateship of the Royal College of Veterinary Surgeons, and there is no doubt but that the title of the "Father of the Profession in America" was never more deserved by anyone. It was a title universally accorded to him by his American colleagues, and one of which he was very justly proud.

His memory will never die, and his example will ever be one to be followed and looked up to.

Note.

In our issue of November, 1917, there appeared an article by Captain E. A. Watson, C.A.V.C., entitled "Report on Ulcerative Cellulitis—Ulcerous Lymphangitis." With regard to the preparation of the vaccine used, it should have been stated that this was prepared according to the method of Truche—"Traitement bactériothérapie de la lymphangite ulcéreuse," by C. Truche.—Annales de L'Institut Pasteur t. xxxi. No. 5 May 1917."—By an unfortunate oversight and late arrival of the revision this was omitted.

Review.

VETERINARY *Post-Mortem* TECHNIQUE. By W. J. Crocker, B.S., V.M.D., Professor of Veterinary Pathology, School of Veterinary Medicine, University of Pennsylvania. Octavo, cloth XIV. + 233 pp., 142 illustrations. J. B. Lippincott Co., Philadelphia and London.

THIS book fills a marked gap in English veterinary literature. We all value the services of the horse-slaughterer, and few of us feel quite competent to closely criticise his procedure at a *post-mortem.* The truth is that we depend on him almost as much as we do on the plumber, the mason, or the sweep. The reason is that quite a minority of us has ever been properly instructed or served our time at *post-mortem* work. Quite too little attention is given to the mechanics of dead body examinations in our College curriculum. This work will instruct us on how to proceed and it may be accepted as a good standard text book on the subject. The directions given as to opening a carcase, and the steps to be taken in a systematic examination of the internal organs, are clear and good. Many *post-mortem* instruments are enumerated and illustrated, and whilst the possession of all of them would not be a commercial asset to the general practitioner, yet one or two of them are of exceptional value, especially to the country veterinary surgeon.

There are eleven chapters in the volume, and the work on horses, cattle, sheep, swine, dogs, cats, mice, guinea-pigs, rabbits, fowls, and elephants is fully discussed and described. There is one valuable point in *post-mortem* decisions that we miss; we refer to a consideration of the dimensions and weight of normal organs in dead animals. For comparative purposes and forensic cases this information is of vital importance. We hope the author will remedy the defect in a future edition. The binding, printing, paper, and get-up of the book are first-class.

G. M.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière-Rand, London."

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CAPT. W. J. E. MACKENZIE, M.C., A.V.C.
Awarded the Military Cross.

THE

VETERINARY JOURNAL

Editor:

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor:

GLADSTONE MAYALL, M.R.C.V.S.

AUGUST, 1918.

Editorials.

RESEARCH WORK.

THERE may be a difference of opinion as to whether State aid and control will benefit all national constructive work in the times ahead. We are of those who believe that too large a measure of control of the milk supply would not be beneficial to the nation. The production side of the question needs perhaps more consideration than the collecting and distributing side of it. It is questionable whether too tight a control of production would not militate against individual energy and enterprise, and thus lessen rather than increase the milk supply. State aid and control of the dyeing industry has not been a success, and the individual energy and enterprise of one firm have easily beaten the State-aided movement of another source of dye-stuffs.

Medical research is, however, on a somewhat different plane from industrial research. A great deal of the former must necessarily be unproductive from a monetary point of view. Much ground will often have to be travelled for apparently little result, either scientifically or materially. There is no doubt, however, about the necessity of an adequate supply of money if medical and veterinary research are to advance and prosper and produce the good results which all professional men desire.

In the work of reconstruction after the War, when some of the finest brains in the world will be wanting fields for their activity, it is to be hoped that veterinary research will come in for a due share of consideration and recognition by our politicians and statesmen. As we have frequently stated, *the healthy development and increase of a country's flocks and herds are the surest indications of its true advancement and prosperity*, and it behoves the State to support research into the problems of animal disease liberally and whole-heartedly.

The times are hard, we know, but industrial research is being stimulated *even now*, and quite recently the Yorkshire Textile Research Committee intimated that it had an assured income of £5,000 a year. Cotton, linen, silk, and jute associations are in existence, and all working on energetic lines.

Medical research needs to keep awake, and its claims to be kept to the front by importunity and increasing vigilance. It is not hopeful and encouraging that the amount for Scientific and Industrial Research dropped during the last financial year from £1,063,325 to £148,350; and also last year a grant of £1,000,000 given for research work has not been repeated. The sum of £30,000 has been given in grants to universities, colleges, and medical schools to save the institutions from serious permanent detriment; but this sum seems quite paltry and inadequate for the prosecution of vital, nationally beneficial, and glorious work, and the real interests of medical and veterinary science need more keen and all-round visualisation by our politicians and statesmen.

G. M.

TEXT-BOOKS.

In the progress of professions and trades perhaps due credit has not been given to the writers of text-books. Whatever the sphere of activity, good instruction books help towards clear thinking and acting. Out of the jumble and scurry of the operations in the present war, well ordered first principles to check unnecessary and overlapping effort will surely receive due consideration and be recorded as sign-posts for future generations. The diseases peculiar to war will be classified and listed, and some clear, concise, and easily accessible information be tabulated and set down. The transport of horses, the care of horses and mules, the keeping of them fit in the lines and on the march, the hygiene and purveyance of meat for the army, text-books on personal hygiene and cleanliness, and food and water supply are all matters in which the ordered hand and brain can work for the future good of crowds of eager brains and willing hands. The man who never takes up a text-book nor consults it is apt to run to seed very early in life. The writing of a good standard text-book is a work of considerable tact, discernment, and discretion. There is a difference between text-books and reference books. A text-book needs to be full, complete, and yet not vapid, abstruse, disjointed, and wandering. It is a thing that a man can rush to at any time, and come away from with a clearer brain and a difficulty changing into a well-defined step to success.

Bricks cannot be made without clay (we believe that straw is unnecessary now), and we sometimes wonder whether the many perusers of text-books ever consider how they are produced and compiled. The Germans destroyed the beautiful library of Louvain in August, 1914, with all its precious and priceless books and manuscripts, and at one and the same time registered an outrage on Belgium and a crime against humanity. Treasures and learning were very cheap in their eyes. Yet around us we see almost daily a greater loss of learning because few men hand down their accumulated wisdom, knowledge, and experience for the benefit of future generations. The loss of the apprenticeship system, the vein of pure laziness, and the spirit of the man who said "Do you think I'm going to read and study night after night and then go about telling everybody?" are chiefly answerable for this state of affairs. It is only from copious recorded and handed down experiences that the art and craft of medicine and medical science can advance. Incidentally, also, it is only from our own experience and that of others that the material for good text-books can be culled, collected, and compiled.

Text-books should be short and complete, and point the arrow to bigger works dealing more fully with any subject about which information is desired. In a word, a text-book is a pioneer for a book of reference. Most men like vital information in tabloid form in these days of rush and haste. A short and handy text-book secures the biggest circulation and perhaps does the most good. Mark Twain having dictated a short story to a lady, the latter remarked: "It's pretty short for a book." The reply was this: "Did you ever know about my prize joke? One day I went to church, heard a missionary sermon, was carried away—to the extent of a hundred dollars. The preacher kept talking—I reduced my note to fifty dollars; he talked on—I came down to twenty-five, to ten, to five; and after he had said all that he had in him, I stole a nickel from the basket." Reason for yourselves. G. M.

Original Communications.

THE CONTROL OF LICE ON HORSES, WITH ESPECIAL REFERENCE TO WINTER CONDITIONS.

By MAURICE C. HALL, Ph.D., D.V.M.,

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(*Concluded from p.* 253.)

Some experiments *in vitro* covering volatile substances primarily, but incidentally some non-volatile ones, were carried out as follows :—

Lice were taken in lots of eight or more and momentarily immersed in the fluids noted below, the immersion being just long enough to wet the lice and the horse hairs to which they clung ; they were then lifted out and placed with the hairs in a bottle. This was incidental work, which was interrupted at times by more urgent matters, and there are wide breaks in some of the observations.

HÆMATOPINUS ASINI.

Kerosene.—No sign of life after dipping.

Kerosene, 10 %; *Methyl alcohol* 90%.—Some alive 1 hour and 35 minutes later ; all dead 19 hours later.

Glacial acetic acid, 10 %; water 90%.—Some alive 8 minutes later ; all dead 19 hours later.

Glacial acetic acid 25% ; *water* 75%.—No sign of life after dipping.

Glacial acetic acid 50% ; *water* 50%.—No sign of life after dipping.

Glacial acetic acid.—No sign of life after dipping.

Glacial acetic acid 10% ; *methyl alcohol* 90%.—One louse alive 3 hours and 35 minutes later, others dead ; all dead in 13 hours.

Glacial acetic acid 5% ; *methyl alcohol* 94% ; *Coal tar creosote oil* 1%.—No sign of life after dipping.

Methyl alcohol.—No sign of life after dipping.

Methyl alcohol 90% ; *fluid extract of quassia* 10%.—No sign of life after dipping.

Fluid extract of quassia 10% ; *water* 90%.—All alive an hour later ; all dead in 22 hours.

Coal-tar creosote dip (*Kreso dip No.* 1) 1% ; *Methyl alcohol* 99%.—No sign of life after dipping.

Coal-tar creosote dip (*Kreso dip No.* 1), 1·6% ; *water* 98·4%.—All alive 5½ minutes later ; all dead in 21 hours.

Liquid petrolatum (*American oil*).—Lice moved for a few moments and gave no sign of life afterwards.

Checks.—Kept at same temperatures, 21–24·5° C. ; all dead in 23 hours.

TRICHODECTES PILOSUS.

Methyl alcohol 90% ; *fluid extract of quassia* 10%.—No sign of life after dipping.

Coal-tar creosote dip (*Kreso dip No.* 1) 1% ; *methyl alcohol* 99%.—One alive in 2 hours and 50 minutes ; others dead ; all dead in 21½ hours.

Coal-tar creosote (*Kreso dip No.* 1) 1·6% ; *water* 98·4%.—One alive 30 hours later ; all dead in 45 hours.

Fluid extract of quassia 10% ; *water* 90%.—Four alive 48 hours later ; One alive 147 hours (over 6 days) later ; all dead in 7 days.

Liquid petrolatum (*American oil*).—Lice moved for a few moments and gave no signs of life afterward.

Checks.—Some were alive at the end of 103 hours ; all dead in 120 hours.

A consideration of these experiments indicates that *Hæmatopinus* only lives a short time off its host, regardless of insecticidal treatments applied, so that unless an insecticide kills rapidly, little can be inferred. Some insecticides are extremely effective, but slow in their action, and sucking lice die too soon to permit of conclusions in regard to the action of such insecticides.

Of the substances tested on *Hæmatopinus*, the following killed immediately or almost immediately : Kerosene ; glacial acetic acid in strengths of 25, 50, and 100% ; glacial acetic acid 5%, methyl alcohol 94%, coal-tar creosote oil 1% ; methyl alcohol ; coal-tar creosote dip (Kreso dip No. 1) 1%, methyl alcohol 99% ; methyl alcohol 90%, fluid extract of quassia 10% ; and liquid petrolatum (American oil). It is practically impossible to draw conclusions from the other experiments, except to the effect that the substances used are not immediately or rapidly lethal for *Hæmatopinus* when subjected to momentary immersion in them.

Of the substances tested on *Trichodectes* the following killed immediately, or almost immediately : Methyl alcohol 90%, fluid extract of quassia 10% ; and liquid petrolatum (American oil). The following were evidently effective, but slower in their action, the relatively long time between immersion and death resulting from shortening the time element in the immersion : Coal-tar creosote dip (Kreso dip No. 1) 1%, methyl alcohol 99%, and coal-tar creosote dip (Kreso dip No. 1) 1 6 %, water 98·4%. Fluid extract of quassia was evidently devoid of insecticidal action on *Trichodectes* as used (*i.e.*, by momentary immersion), for the insects treated outlived their checks.

It is rather surprising to find that either kerosene or methyl alcohol was immediately lethal for *Hæmatopinus*, but a mixture of 10% kerosene and 90% methyl alcohol was much less effective, some lice being alive an hour and 35 minutes later. Similarly, it is surprising to find that 90% methyl alcohol with 10% fluid extract of quassia (fluid extract of quassia in the experiment with *Trichodectes* being ineffective in momentary immersion) was immediately lethal, whereas 90 per cent. methyl alcohol with 10 per cent. glacial acetic acid (glacial acid being immediately lethal in 25 per cent. solution) left one louse still alive 3 hours and 35 minutes later.

Not too much may be concluded from the foregoing experiments, but everything indicates that methyl alcohol may be used successfully in lice control in winter. The horse should be sponged with a liberal amount of alcohol, then brushed, then sponged and brushed again. If this work is not done carefully, the failure to get results will show it. While the alcohol may exert a detrimental effect on the louse egg, and probably does, an effective exposure of the eggs to the alcohol can hardly be assured by sponging, and two treatments at 20-day intervals would be indicated for eradication measures.

(3) Fatty or oily preparations are not infrequently recommended for freeing horses from lice. They are objectionable on account of the fact that such preparations are rubbed off the horse on to the stall, harness and everything else with which the horse comes in contact, and if the persons who have occasion to handle the horse escape soiling their clothing from the horse direct, they will usually succeed in soiling it from contact with these objects. Furthermore, fats and oils are frequently depilatory for horses and must be used with caution. Why a horse is so prone to lose hair on apparently trifling provocation does not seem to be well known, but it is well known that they lose it. In this connection it will be noticed that tests *in vitro* showed liquid petrolatum (American oil) to be very effective against both species of lice. Lest someone should test liquid petrolatum in practice as a louse killer, I hasten to add that it is also depilatory. My attention was called to the fact that liquid petrolatum is depilatory by Dr. David Buckingham, of Washington, D.C., about two years ago, and I have confirmed the fact by test since.

The only oily dressing I have tested to any extent as a treatment for lousiness in the horse, is horse fat. Kirk (1917) recommended this fat for oily dressings in very bad cases of mange, as a preliminary to dipping in a calcium sulphide dip. He states: "I am certainly sure that an oily dressing does blister the skin, no matter what oil is used—with one exception—and that is the oil obtained from the boiling down of carcasses of the horse. The fat obtained in this way appears to have not the least derogatory effect on the skin, but on the contrary is of very great value, and it can be confidently recommended." Kirk has nothing to say in regard to using this horse fat to combat lice, but as it appears from investigations in the control of lice on man that such substances as petrolatum are substantially as effective as medicated preparations having petrolatum as a base, the action being primarily mechanical and consisting in coating and suffocating the louse, it seemed evident that horse fat would kill lice, and, according to Kirk's report, would not injure the horses' coats.

We tested horse fat, or a mixture of 4 parts horse fat and 1 part linseed oil, containing 3 per cent. coal-tar creosote oil, on fourteen horses, the weather at the time being very cold, sometimes above zero, and sometimes below, but seldom much above zero. The fat was obtained from a rendering tank and had a melting point around 25° C. (77° F.). The fat was melted by immersion in a container in water heated by steam until the fat was fluid, and the melted fat was applied to the horse by means of sponges or wads of cotton batting. During the cold weather then prevailing the fat on the ends of the hair would promptly chill out and solidify soon after the animals were returned to the barns, the chilled fat pasting clumps of hair together in quills. When this was brushed or combed, fat from the warmer region, close to the body, would slowly flow out on the hair and solidify in turn. The quilling effect exposed the skin to the cold, with the result that these horses would shiver in cold weather when other horses were standing still and showing no indications of being cold. Offhand one would suppose that oil or fat on the body would aid in keeping it warm, but experience proved that this was not the case, the reason being apparently the quilling or clumping of the hairs and the consequent exposure of the skin between the hair clumps.

Of the fourteen horses treated with horse fat, six were not groomed for several days after treatment, the idea being that the fat would not injure the coat and that it would serve to kill young lice as they hatched, provided they hatched. These horses suffered depilatory effects, some of them losing large amounts of hair, contrary to what Kirk's recommendations had led us to expect. The other eight horses were groomed the day after treatment and the fat removed daily with comb and brush and rag as fast as it flowed down the hairs and congealed. These horses did not suffer depilatory effects.

To test out the apparent fact that horse fat would not cause depilatory effects where it was not allowed to remain too long, four additional horses were treated. As soon as the first animal was treated the fat was scraped off as completely as possible with sweat-scrapers. A second animal was treated, and then curried immediately. A third animal was treated and sent back to the barn with instructions to curry it promptly and as often as necessary to keep down the accumulation of fat on the hairs A fourth animal was treated and then washed down with methyl alcohol to remove the excess fat ; this was not a very satisfactory way of removing the fat. All horses were curried daily. None of them suffered depilatory effects. The use of the sweat-scraper proved the most satisfactory method of removing the excess fat and preventing depilation. Apparently the excess fat exerts a " smothering " effect on the hair follicles. This is not intended as a lucid and scientific explanation of the loss of hair ; it is, however, substantially as lucid, scientific, and plausible as most of the explanations for bald-headedness in men.

Horse fat proved entirely effective as a louse killer. It had some effect on the eggs, as only seven hatched out of several dozen tested after removal from horses treated with the fat, and none hatched out of forty-seven removed from a horse after treatment with the horse-fat linseed oil creosote oil mixture.

The eggs in both lots looked abnormal. They were discoloured, shrivelled, or contained air bubbles, as a rule. It seems quite reasonable that hardening films of fat would seal the embryo away from its necessary oxygen supply, and perhaps seal the lid of the egg against efforts of the young louse to escape from the shell.

(4) Powders are sometimes used against lice, but with the exception of sodium fluoride, which the writer (Hall, 1917) found entirely effective against biting lice, and entirely ineffective against sucking lice, powders are usually unsatisfactory. The effectiveness of ordinary louse powders is largely a function of those constituents which are simultaneously volatile and toxic. The toxic effectiveness of volatile substances is largely determined by the degree of concentration of the volatilised material, and in applying a powder of the sort to a horse one is working under a set of circumstances which make for ineffectiveness. A powder which is fundamentally good will kill some lice and stupefy others, but the latter will recover as the material capable of volatilising is driven off by the heat of the animal's body. Experiments and experience show that the idea that finely pulverised material clogs the breathing apertures of insects and so mechanically suffocates them is not tenable, or the actual injury so accomplished is usually very slight.

Inasmuch as naphthalene is one of the most effective of the powdered insecticides, being the principal constituent of many insect powders, and practically the sole constituent of " moth balls," a test was made of a mixture of approximately equal parts of naphthalene and plaster of Paris, a horse being covered with the mixture, then covered with gunny sacks with the mixtures rubbed into them, and finally blanketed for 20 minutes to hold the volatilised naphthelene as much as possible.

The horse was said to be lousy, but we saw no lice. Nine days later the horse was examined and a number of lice found.

Another horse was tested with a mixture made up on the formula of the "Lawry lice powder," but substituting a coal-tar creosote oil for the crude carbolic acid in the following formula: Mix 3 parts of gasoline with 1 of crude carbolic acid, and stir in enough plaster of Paris to make a dry powder. This mixture was applied to a lousy horse and the horse blanketed for half an hour. Nine days later the horse was still lousy.

In the control of lice on man, louse powders have proved to be of more value as palliative measures than as eradicative measures. They appear to be of service principally in tiding over individuals who become infested under conditions that do not permit of adequate insecticidal treatment at the time. Since this is the case in regard to lice infestations on man, where the clothing can be utilised to hold the powder and its vapours, still less success may be anticipated in lice infestation on horses where the vapours from volatile constituents can pass readily through the short coat of hair and escape.

(5) The application of insecticides in the form of fumes to horses is hardly feasible under the ordinary conditions of veterinary practice, as some sort of fumigation chamber must be provided in order to expose the body of the horse to the fumes and at the same time to provide the horse with air free from toxic fumes to breathe during the fumigation process. However, under conditions where the number of horses and the need of treatment warrant it, this method of treatment may be used. It has been used during the present war in the control of mange in French army horses, and the fumigant used there in the control of mange, sulphur dioxide, has also been found adequate for the control of lice. The writer has never tested fumigation as a control measure for lice.

I take pleasure in acknowledging the friendly co-operation and assistance of Dr. R. H. Wilson and Dr. L. A. Maze in carrying out these experiments.

SUMMARY.

The best control measure for lice on horses is eradicative dipping in summer. There are numerous aqueous solutions that are satisfactory, the ones in most common use being the coal-tar dips. These preparations are effective, uninjurious, comparatively cheap, and readily obtainable. Their use in winter is feasible at times, but is limited by the danger of chilling, and consequent production of pneumonia. Eradication dipping calls for two dippings at a 20-day interval.

Of the volatile substances that may be used for lice control in winter, methyl alcohol seems to be the most satisfactory of the things

tested, as it is effective, is not too expensive; and does not injure the hair or coat. It is inflammable and somewhat unpleasant to handle. It cannot be depended on to kill eggs, so two treatments at a 20-day interval are indicated.

Of the fatty or oily substances that may be used for lice control in winter, horse fat appears to be a fairly cheap and satisfactory representative. It should be melted and applied, and the excess promptly scraped off with a sweat-scraper. After treatment the horses should be thoroughly groomed daily to remove the fat which flows to the tip of the hairs. The treatment has the disadvantage of greasing the clothing, stalls, harness, and other things with which it comes in contact. Contrary to what one might expect, horses so treated will be colder in very cold weather than horses not treated. It is non-irritant, but if it is left on and the horses are not groomed for several days, it has a depilatory action. It appears to be injurious to eggs, but some eggs will hatch after this treatment so that eradication would call for a second treatment at a 20-day interval. Most oils, whether fixed or volatile, are depilatory for horses, and the volatile oils are commonly irritant as well, producing dermatitis.

Powders do not appear to be very satisfactory substances for the control of lice on horses. They are not especially effective on man, where conditions are better and where many tests of various preparations have been made. They apparently exert no effect on the eggs and can only be regarded as palliative, killing a few lice, and temporarily stupefying or disturbing others.

Fumigation with sulphur dioxide appears to be a dependable measure for the control of lice on horses, but it has only limited application. It appears to be a useful measure in the army, where it is intended primarily as a treatment for scabies.

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TANNIN AND TANNING.*

By P. G. BOND, M.R.C.V.S.,
Plymouth.

THE subject brought forward this afternoon for your discussion is suggested to me by the prominence into which agriculture has within the past few years forced its claims as the premier industry, owing to its vast importance to us, as a nation, now that we are engaged in one of the greatest struggles for our existence since the days of the Norman Conquest.

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* *Paper given to the Chemistry Section, Plymouth Institution.*

Self-preservation is the first law of nature. The great problem of our food supply is so pressing it behoves us to make every effort in reclaiming from Mother Earth the materials for our subsistence.

I venture to think that the article tannin and the industry of tanning are important factors in bringing about the desired result. I will try and explain, first by giving a simple description of the one, then a short account of the process of the other. I wish to provide material for bringing out your ideas on what is of vital interest to all. First as regards tannin or tannic acid, an acid extracted from oak bark and from galls. It occurs in pale yellow vesicular masses or thin glistening scales. Its solubility 10 in 3 of water. Its composition $C_{27}H_{22}O_{17}$. Tannin is the astringent principle of oak bark, nut gall and other trees, used in converting raw hides into leather, now called tannic acid. Oak bark is the dry bark of the small branches and young stems of the *Quercus Pedunculata* collected in spring from trees growing in Britain. Galls are excrescences on the *Quercus Infectoria* caused by the punctures and deposited ova of the *Deplolepis Gallæ Tinctoria*, chiefly from the Mediterranean and the East Indies. All the soluble matter of galls is taken up by forty times their weight in boiling water and the residue is tasteless.

Galls of commerce are produced as follows :—On the sides and the ends of the branches and shoots of the trees the female makes a puncture with her ovidepositer and deposits her ova. An excrescence or gall is soon formed within which the larva is developed. As soon as the perfect insect is produced it eats its way out. If we examine those galls from which the animal has escaped one observes externally a circular hole of about a line in diameter leading to a small canal which passes to the centre of the gall. But in those galls in which the insect has not put off its pupa state we find neither an external hole nor an internal canal. Levant galls are the ordinary galls of commerce. They are imported from Syria, Smyrna and Constantinople.

Sir Humphry Davy found in one hundred parts of good Aleppo galls tannic acid 26, gallic acid with a little extractive 6·2. Infusion of galls reddens litmus paper, forms an inky compound on the addition of a persalt of iron, tannogallate of iron, and a yellowish white precipitate with a solution of gelatine, tannato of gelatine. If a piece of skin depilitated by lime be immersed in the infusion and agitated with it for some time, all the tannic acid is absorbed, the filtered liquor striking a blue colour with the persalt of iron, gallate of iron, but giving no precipitate with a solution of gelatine. Galls contain a larger portion of tannic acid than any other known vegetable production. It is this precipitation of gelatine in the cells of the animals' skin that constitutes the act of conversion into leather.

A tanner is one whose occupation is to tan hides. Tanning is the process of converting raw hides into leather by tannin. I give these explanations from the dictionary, because I am doubtful if the definitions hold true to-day.

NOW AS TO TANNING.

The manufacture of leather is one of the oldest industries in the world. Leather was required in the days prior to so-called civilisation to provide sandals for foot wear, for domestic utensils, for weapons of defence in war. The shields carried into battle were made of leather. Harness for the horses for the transport of food, merchandise and war material before the use of iron became general. For saddlery and various other things for domestic use.

The calling of the tanner was an honourable one. The business was lucrative and stable. When St. Paul went down into Tarsus as a missionary he lodged with a tanner. He was born at Tarsus. He may have been the son of a tanner. The mother of William the Conqueror was the daughter of a tanner. The Tanners' Company in London, is one of the oldest and most opulent of London companies.

The Black Jacks and utensils for the kitchen in the homes of the Thanes and Earls were of leather. The leathern jugs at Mount Edgcumbe and Cotehele are nearly 300 years old and still in use. The Glanvilles of Tavistock were tanners and had their tanpits at Whitchurch.

There was scarcely a country town of any importance but had its tanneries, its curriers and fellmongers, about fifty years ago. In Devonshire alone in or about 1850, there were 85 tanyards, now almost extinct. The then absence of railway accommodation probably accounted for this. In those days more reliance had to be placed on individual effort. Now, everything has been centralised to our disadvantage. In Plymouth there were the Tanners of Tavistock Road, the Wards of Coxside, the Cridlands of Stonehouse, besides others. The supply of hides was obtained locally; the carcasses of dead animals were always sent to the tanyard for disposal and nothing was lost. Leather of the best and absolutely impervious to moisture was manufactured and continued to be made up to the arrival of steam ships. Forty to fifty years ago the hides were brought from the Argentine and South America. Then, owing to so many petty restrictions in admitting them to our ports, the trade was directed to the Continent, where their arrival was encouraged. The examinations and their disinfections were not so severe as at our ports, and our supply fell off.

It has been said that an animal may arrive at Deptford by steamer from America to be slaughtered and skinned, the carcase sold for food, the skin restored to America in another steamship, made into leather and again returned to England to make boots with. This appears very wonderful, but of what real use is it if it is only a temporary success? The leather made in this way is not like the old leather, British make, leather made in the old way, by tanning. Chemicals, acids, are largely used. The utility of the leather is doubtful. The old tanyards and tannery businesses are swamped. No competition can be offered. The industry dies. The cheaper and inferior articles are forced and the public suffer. I say cheaper by mistake. I mean lower price. It is not cheaper but dearer in the end.

TANNING.

Bark-oak, rinded after the felling of the trees in winter, and after thorough drying, faggoted, and brought to the tannery in June and sold from £6 upwards per ton. It constitutes a period termed the "bark harvest." Local supply being insufficient, quantities were brought by ships from various places on our coast. Several hundred tons were housed or stacked and thatched.

Valonia, the acorn-cups of *Quercus Aegilops*, which are exported from the Morea and Levant, used in tanning, as they contain abundance of tannin. *Sumac*, Sumach or Shumach, the powdered leaves, eduncles and young branches also used.

The bark is ground in a mill in small crushed pieces, and is then placed into well, made, wood, lined pits, in definite quantities according to capacity of pit and water. This forms the tan liquor and its gravity is measured by an instrument for that purpose. After the various skins are placed in this liquor, and occasionally lifted out and replaced, they are passed on to other pits and so on until the long process of tanning the skin is completed. When the liquor is exhausted it is pumped or dipped out and thrown away. The tan or exhausted bark is placed into heaps and the parts of the heap exposed to air and sun form a ready fuel for any fire, the burning of which gives off a pleasant aroma.

In a more advanced state of decay the tan is mixed with water and trodden by a horse into a pulp. It is then taken in a barrow with a bench and a square of iron—9 inch—and the man, taking the pulp and patting it into the iron square, raises it pyramidically, after taking it out and placing it on a rack for drying. This was called a turf and sold for three for a penny. It formed a cheap winter fuel, especially for the poor, and many thousands were made yearly. Also the fresh tan was readily sold to conservatory owners. A large brick trench or reservoir was built in the house and cartloads of tan were bought to fill this trench, and with the radiation of the sun this quantity of tan generated a uniform heat and was the means of heating during the night. In a more advanced state of decay it could be used as manure. Lime and alum are other substances used in the preserving of skins.

HIDES, ETC.

The supply of hides and skins was insufficient, and quantities of salted hides from Buenos Ayres and Monte Video were imported and thus helped the enormous demand for leather. The hides are skins of bullocks and horses. Skins, a general term, but applied to skins of sheep, pigs, etc. All bought by weight. Hides brought from the butcher contained the horns and that part of the skull between them, a few fleshy pieces of meat attached to the skin, and the tail. These were the tanner's perquisites, and many dainty dishes were made from the head piece, the tanner's steak and the tail. All skins were placed in pools of clear running water for a day or two, then placed into lime water for the hastening of the removal of the hair from the skin, then re-washed, before placing into the tan liquor. Skins of sheep were treated similarly for removal of wool, and at this stage are known as " Pelts." After the process of tanning, sheep skins are known as " Basils." The bullock hide is, after the lengthy process of tanning, hung on poles to dry, and in the process well rubbed at the back of skin with fish oil. When sufficiently dry, it is rolled with a heavily weighted roller on a prepared bed for that purpose. The centre part is known as the " Butt."

Horse hides may be cured by the alum and lime process, and it is " white leather " when complete. It is most useful, especially for whips, aprons, etc. The skins of the leg and head parts may be treated in the same way of curing, and are useful for gloves and rough leggings for the woodman. The parts known as " shreds " are useful to the paper makers, as size can be obtained from them, and used in the sizing of paper. This important branch of industry has departed or in some centres decreased, evidently caused by the more intense chemical preserving of hides, discovered and developed in the path of science.

The wool was a most valuable product stored and sold by the tanner and the hair of animals preserved and dried for sale to the upholsterer, saddler and mason, in their respective trades.

It has taken a European war in which we are engaged for our very existence to convince us that agriculture is the first of industries. By agriculture I mean cultivation of land, breeding of animals and their rearing, fruit growing, forestry, implement making and leather making. This last is by no means the least. It is of no use creating agricultural colleges and schools, model farms, up-to-date buildinge, going in for pedigree stock, if the agricultural labourer and those who work on the land cannot have boots made of leather that will keep the feet dry. Why should he run the risk of pneumonia, rheumatism, and sciatica, just to próduce food for the dwellers in town ? Have any of you been on the land in wet weather for a whole day, in your present boots ?

Why must we go to Norway, Russia, Germany, America, and France, for leather ? I know the difficulty myself. Only in 1914 I asked to have a pair of boots made that would stand the wet and keep my feet dry. They cost me four guineas. To-day they are quoted at eight guineas. It was not the fault of the maker that the price was so high. The leather was Norwegian. Why should an agricultural labourer be handicapped in such a way ? How can he be expected to do his work in comfort ? How is he to obtain the boots ?

The one great question affecting agriculture is leather. With our Colonies a large number of skins could be brought here instead of their being taken to Hamburg. We should then be able to revert to the old style. The price warrants a trial. The Government are probably afraid of introducing disease through the skin. This could be got over. When the men return from the war and are placed on the land, as suggested, they must have proper boots. They will never stand it else. Who is to supply them, the Government or themselves ? I take it that these chemistry meetings in connection with this Institute are taken up with a view to provide substitutes for the things we have usually relied on the foreigner to produce. It does not appear they can continue to do so. I hope it is not too late.

Why not try and recover the leather-making industry locally ? A resolution suggesting this may be offered to the Board of Agriculture. An expression of opinion from the Board may be helpful. We have allowed an important trade to drift away. It will be difficult to recover, but the effort is worth making. I am of opinion that good leather is the main want in the success of agriculture. It may appear trivial. I do not think so, and, whilst not quite agreeing with the opinion expressed at the conference called to consider the defence of ancient Troy, that in the opinion of the tanner " there is nothing like leather," still there is more in the idea than at first meets the eye. If good leather is not forthcoming there will be no labourer ; if no labourer no farm produce ; if no farm produce no subsistence, consequently no development ; if no development no function—then decay follows :

> " Ill fares the land, to hastening ills a prey,
> Where wealth accumulates and men decay."

To sum up, the gist of the matter is expressed in the word " Boots."

Clinical Cases.

PARAPHYMOSIS IN THE DOG.

By HENRY B. EVE, M.R.C.V.S.,
Folkestone.

Subject.—Field spaniel used by my client for shooting purposes, and a very valuable dog.

History.—Never used for stud purposes, as far as known. Unilateral cryptorchid. Found by the keeper in the above condition, which appeared very suddenly, and without any apparent cause, which nonplussed him, never having seen one like it before, although he had been a gamekeeper for over 20 years, and said he thought he knew all that was worth knowing about dogs' ailments. Been bad three days ere I was consulted.

Symptoms.—The penis protruded out of the whole length of sheath: and was paralyzed, the " glans " and whole organ being so tremendously swollen that the prepuce could not be drawn over it. This had assumed an alarming size and colour, being of a purple hue, intensely inflamed and congested. The dog was able to micturate only in drops, and passed blood. Urine drawn off by catheter twice daily. He showed an anxious expression of countenance, and suffered acute pain. Constipation present, animal refused all food, strained violently, and arched its back as if suffering from kidney trouble. Fæces removed and by urine enema given.

Diagnosis.—" Paraphymosis."

Treatment.—Removed dog to Infirmary, applied locally ice, and refrigerant lotion to reduce the swelling, and smeared a little salad oil over organ, and tried to return, but without success. Gave Hypo. Inj. Morphia to relieve pain. I then bathed the organ with cold water, and injected cocaine, adrenalin and boric acid (Parke, Davis & Co.), which reduced the swelling a good bit, and adopted " scarification," punctured in several places with a fine suture needle, which treatment proved successful, aided by pressure and manipulation. Gave internally tablets (P., D. & Co.) for cystitis, P, boric acid, potass. bicarb, ext. triticum, buchu ext. rea-Mais, ext. hydrangea, sulphate atropine, thrice daily, and an aperient (calomel and opium) pill. Sent medicinal paraffin to give regularly daily to relieve constipation.

Diet.—Glaxo and barley-water to drink, Vichy water and milk

Remarks.—The adrenalin appeared to act very quickly, and certainly was a great help in causing reduction, and accelerated return of penis to the sheath. Think cause probably due to dog abusing himself (masturbation).

TYMPANITES IN DOG.

By G. MAYALL, M.R.C.V.S., *Bolton.*

Brown curly-coated retriever.—Vomiting, and abdomen measuring 24 inches in circumference just in fromt of penis. Palpitation drum-like, and no waves on percussion; in feel like a football blown up. I inserted horse trocar and canula high up and downwards and forwards in right flank. Air rushed out for three minutes. Great relief of dog and cessation of vomiting. Abdomen now measures 20 inches in circumference.

Gave aredicum liq. am. fort. 5 minims, taraxacum 1 fl. drachm, tr. nux. vom. 10 minims, and repeated next day. Could detect no foreign body in stomach or bowels. Dog made an excellent recovery.

Find no record in canine text-books of hoven in the dog; probably due to war rations.

RINGWORM IN THE DOG.

By G. MAYALL, M.R.C.V.S., *Bolton.*

Irish terrier dog with flattish raised fibrous looking tumour on outside surface of left ear and five ringworm patches on neck and back region.

Dressed patches daily with storax, sulphur, and carbolic ointment, and removed tumour on ear and causticked surface with silver nitrate daily. After three days gave dog a nascent sulphur bath with creolin in very dilute solution (a teaspoonful to 4 gallons of warm water), and continued dressing of ringworm areas. There were few scales in the affected areas, but the bare places were well defined. Repeated sulphur bath at weekly intervals. The hardest thing to cure was the ear; but colsorlene paste (see p. 415 *V.J.*, Nov., 1917) painted over the raw surface after causticking helped materially.

The litter in the kennel was frequently removed and burnt.

INTERESTING CASES.

By J. R. BAXTER, M.R.C.V.S.

WOUND IN CALF.

Steer calf 9 months old and strong; called on May 7th, to see if anything could be done; found calf down on side with a wound 4 ins. long high up on right flank, through which about sufficient small intestine to fill a peck measure was protruding and a man with an exceedingly dirty coat sleeve and hands was endeavouring by *grabbing* at it to prevent more coming; case looked pretty hopeless, but as owner was pressing, decided to try; so washed with perchloride solution followed by normal saline in quantity and warm, replaced gut and sutured with tape; left instructions to keep quiet as possible and feed on thin gruel for a few days. I only saw this case twice more, at intervals of 3 days, and the calf never looked back; temperature only rose one degree all through and appetite never failed. I remember an almost similar case in a horse staked in groin, a few years back, and similarly treated, which, except for an enormous swelling which gradually subsided, went on equally well. Moral, never despair. (But why no peritonitis?)

STOPPAGE IN STEER.

Two-year-old steer, stoppage; called on May 4th, gave a good dose of linseed oil, stimulants and fluid extract Nux Vomica, and left 3 full doses Liq: Ammon: Acet: Fl. Ext. Nucis Vom., to be given in linseed gruel every six hours; no effect. May 6th, similar treatment with the addition of a full dose of ol. Croton; no effect. May 8th, continued stimulants and 2 injections strychnine and arecolin; result, a few small pieces of dung not particularly hard. May 9th, two more injections strychnine and arecolin, and at last bowels worked freely. Although this case took all this, there was never at any time any tympanitis and very slight pain, and only a slight rise in temperature. I should add that copious enemata were given all through the treatment and the steer has done well ever since.

CURIOUS STATE IN A COB'S TAIL.

Called to see a cob's tail. This was a mare, undocked; had been turned out for two months; owner had noticed nothing the matter till one day the flies seemed very busy, when he had the mare up and called me in. On examination the whole of the hair on the dock shelled off in a mass like a cow's horn, and left the dock raw and bleeding; there was also some ulceration round anus and vulva. Treated by amputating about 6 ins. off end of dock, washing with normal saline three times daily and dusting with pure potass. permang. powdered. Everything healed and hair grew well in a short while. What was the cause?

CASTRATION OF CRYPTORCHID BOAR.

By H. HOWARD, D.V.S.

In performing this operation, I find it best, but not essential, to have the pig's bowels empty. By the use of short ropes looped round the hocks, I hang the pig up in a good light place. This can be accomplished by driving two spikes into the side of a building, or better still, by hooking the ropes into the hooks of a short single-tree and raising it by pulley or small block and tackle. I then have the assistant steady the pig by holding the front legs. Hanging the pig up causes the intestines to gravitate to the bottom of the intestinal cavity, out of the way. I then clip the hair and paint the seat of operation with tincture of iodine, and make an incision about one-half inch on either side of the median line and about one inch below the bladder, making the incision about three inches long. My hands washed clean in an antiseptic solution, with my two index-fingers I part the edges of the wound, bringing the testicle or testicles into plain view. They are quickly removed. If both testicles are in the abdominal cavity they can both be removed through the one incision. The wound is then closed with through-and-through interrupted sutures. The pig is then placed in a clean pen or yard. I have never had any bad results from this operation. Those who have not tried locating the testicle by sight should try it and see how easily the operation is performed.—*Journal of A.V.M.A.*

General Articles.

AMERICAN ARMY VETERINARY SERVICE.*

REGULATIONS GOVERNING VOLUNTARY ENLISTMENT IN THE ENLISTED RESERVE CORPS OF THE MEDICAL DEPARTMENT.

Section 151 (b), Selective Service Regulations, provides for voluntary enlistment in the enlisted reserve corps of the Medical Department of the the Army as follows:

> "Section 151 (b). Under such regulations as the Surgeon General may prescribe and upon receiving permission from the Surgeon General to do so, any medical student, hospital interne, dentist, dental student, veterinarian, or veterinary student may enlist in the enlisted reserve corps of the Medical Department, and thereafter upon presentation by the registrant to his Local Board of a certificate of a commissioned Officer of the Medical Department of the Army that he has been so enlisted, such certificate shall be filled with the Questionnaire, and the registrant shall be placed in Class V on the ground that he is in the military

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* *Reproduced from the Journal of the American Veterinary Medical Association.*

> service of the United States. These is no other ground upon which such persons (as such) may be placed in a deferred classification."

The object of this provision is to enable the military authorities to place the above mentioned class of registrants in the military service where their experience and training can be utilized to best advantage.

For the purpose of obtaining better qualified officers in the Medical Department it is the intention of the Surgeon General, if conditions permit, to allow medical, dental, and veterinary students to complete the course for a professional degree; and to allow hospital internes one year of practical training in a hospital. For this reason these men, after enlistment in the enlisted reserve corps, will be left on inactive duty until the desired training has been obtained; provided, however, that they make satisfactory progress, and that the conditions for obtaining such training are adequate. They may, however, be called to active duty at any time, if the need for their services is sufficiently urgent.

Since graduated dentists and veterinarians have already received a training adequate for the purposes of the Army it will not be the policy of the Surgeon General to leave them on inactive duty; but they will be called to active duty as soon after enlistment as their services can be utilised in the enlisted force of the Medical Department. Where practicable, they will be assigned to duty in the line of their professional work.

For the purpose of attaining these ends, the Surgeon General prescribes the following regulations:

(1) Permission to enlist in the enlisted reserve corps of the Medical Department will be granted in the case of medical, dental, and veterinary students, hospital internes, dentists, and veterinarians, only to students in, and to graduates of, well-recognised schools.

(2) The term " student " in these regulations shall mean a bona-fide member of one of the regular classes in the regular course for the professional degree, in a well-recognized school. Such bona-fide membership should be attested by an affidavit from the dean of the school, or from his authorised agent, duly executed before a notary.

> Note A: In the case of Medical Schools the " regular course " is understood to mean the usual four-year course leading to the degree of M.D. " Special," " pre-medical," graduate, and " post-graduate students in medical schools, and persons studying medical subjects outside of schools which are legally authorized to confer the degree of doctor of medicine, will not be considered " medical students " within the meaning of these regulations.
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> Note B: A medical school which offers only part of the

regular course for the degree of M.D. may be recognised, provided the school is maintained for this purpose, and the equipment and teaching are equal to the standard of well recognised medical schools; and provided the students of said school are acceptable for advancement in other well-recognised medical schools, which give a complete course for the degree of M.D. This provision refers particularly to the medical schools of universities which offer only the first two years of the regular medical course.

Note C: In those medical schools which require for the degreee of M.D. a fifth year, spent in hospital or laboratory, the member of the fifth class shall be regarded as "hospital-internes," within the meaning of these regulations, and not as "medical students."

Note D: Restrictions corresponding to those for medical schools and medical students in Note A shall apply in the case of dental schools and veterinary schools, and in the case of dental students and veterinary students.

(3) A "bona-fide" student, within the meaning of these regulations, is one who has been duly registered by the school as a member of his class at the beginning of the school term; who has fulfilled the requirements of the school for admission to said class; who has been in attendance since the beginning of the school term, in accordance with the requirements of the school; and has satisfactorily done the work of his class to date. Unless a student has fulfilled all of these requirements, the dean should not issue to him the affidavit mentioned in Section 2.

(4) In the case of a hospital interne, a dentist, or a veterinarian, who is a graduate from a well-recognised school, the fact of graduation from said school must be established by an affidavit from the dean of the school, or his authorised agent, duly executed before a notary; which affidavit shall give the full name of the graduate, the name and location of the school, and the year in which the degree was conferred.

(5) The term "hospital interne," within the meaning of these regulations, shall indicate a graduate from an approved medical school, or a student in the senior class of such school, who has received an official appointment in a hospital or medical school, which appointment involves either the care of hospital patients, or such advanced scientific study as will fit him for special scientific medical work in the Army.

(6) Permission for "hospital internes" to enlist in the enlisted reserve corps of the Medical Department will be granted only when the conditions, in the opinion of the Surgeon General, are satisfactory

for the purpose of training medical officers for the Army, and only to such number of internes in an approved institution as the Surgeon General may determine. Such permission will be further dependent upon the time of such appointment as interne, its duration, the character of the work, and the opportunities for training afforded the interne.

(7) The Surgeon General will not recognise interneships in hospitals, sanitoriums or other institutions conducted for profit; or in small private hospitals (50 beds or less); or new interneships in any hospital, if established or added since May 18, 1917, to those previously existing, unless such new interneships are necessitated by and are proportional to an increase in the bed capacity of said hospital.

(8) The approved period of interne service shall not exceed one year; it may begin, under suitable arrangements, any time within the last four months of the medical-school course; it must begin otherwise as soon as practicable after graduation; it must be completed within sixteen months from the last day of the month in which graduation occurs; and, if there is an interval of more than one month between the time of graduation and the beginning of the recognised interneship, the time must be spent in a way that will, in the opinion of the Surgeon General, improve the training of the graduate for army purposes. This intervening time, even if spent in a recognised hospital position, will not necessarily be counted as part of the year of interne service that may be allowed.

(9) Permission for voluntary enlistment in the enlisted reserve corps of the Medical Department is hereby granted by the Surgeon-General to medical students, dental students, and veterinary students in well-recognised schools (as defined in Section 1), provided they present to the recruiting officer affidavits that they are *bona-fide* students in said schools (as required by Section 2); and recruiting officers are authorised to accept for enlistment in the enlisted reserve corps of the Medical Department those students who fulfill these requirements, and to enlist them, if acceptable, under orders and regulations governing enlistments for the United States Army.

(10) Permission for voluntary enlistment in the enlisted reserve corps of the Medical Department is hereby granted by the Surgeon-General to dentists and to veterinarians who establish, to the satisfaction of the recruiting officer, in accordance with the requirements of Section 4, the fact of graduation from a well-recognised school; and recruiting officers are hereby authorised to accept for enlistment in the enlisted reserve corps of the Medical Department those dentists and veterinatians who fulfil these requirements, and to enlist them, if acceptable, under orders and regulations governing enlistments for the United States Army.

(11) All others, including "hospital internes," who may be eligible for voluntary enlistment in the enlisted reserve corps of the Medical Department under Selective Service Regulations, Section 15 (b), and by these regulations must receive permission individually from the Surgeon-General By direction of the Surgeon-General.—*Journal of A.V.M.A.*

AN EFFORT TO RETURN THE AMERICAN VETERINARY SERVICE TO THE QUARTERMASTER CORPS OF THE ARMY.

In a Bill, H. R. 9867, introduced in Congress, the following paragraph was included ,—

So much of section sixteen of the Act making further and more effectual provision for the national defence, and for other purposes, approved June third, nineteen hundred and sixteen, as provides that the Veterinary Corps as therein constituted shall be a part of the Medical Department of the Army, is hereby amended so as to make the Veterinary Corps a part of the Quartermaster Corps of the Army; and, further, so as to authorise appointments of reserve veterinarians in the Veterinary Corps upon the recommendation of the Quartermaster General of the Army. Provided, that all appropriations made for the purchase of veterinary supplies and the hire of veterinary surgeons shall be available for the purpose for which made, and shall hereafter be disbursed through the Quartermaster Corps.

We understand this measure was not passed, on the point of order that it was new legislation included in a Bill for appropriations. Army veterinatians were formerly in the Quartermaster Corps, and there seems to be evidence that the combination was not a happy one. What bearing the reference in the Bill to all appropriations for the purchase of veterinary supplies and *hire* of veterinary surgeon has upon rank for veterinarians is not clear. In the past, we believe a Quartermaster has not been particularly sympathetic toward rank nor generally appreciative of the work of the profession. Veterinarians have fought for many years for the recognition which has now come to them, and any suggestion of retrogression should be promptly and earnestly counteracted. The association of the Veterinary Corps with the Medical Corps gives it recognition as a profession. The relations have been pleasant, and there is a closer and more sympathetic relationship between human and veterinary medicine than the "hire" of the latter in a Quartermaster Corps. The present association with the Medical Corps unmistakably stands for greater efficiency for the veterinarians, and efficiency in all branches is just what is needed to win in this war. Veterinary service among our allies has demonstrated its efficiency. We should profit by the experience of others. The fact that an effort has been made to disrupt the present satisfactory conditions of the veterinarians may indicate that further attempts are to be made. The profession should heed the warning and be on the alert to oppose any action that offers a suggestion of retrogression. —*Journal of the American Veterinary Medical Association.*

Translations.

THE DIAGNOSIS AND THERAPEUTICS OF GLANDERS.*

THE author shows the difficulty of diagnosing clinically, suppressed glanders, and demonstrates the diagnostic value of mallein, describing the reactions which it produces if injected subcutaneously in animals suffering from glanders, and especially if injected intra-palbebrally.

He lays stress on the pathogenic mechanism of the mallein reaction, and explains the difference which exists between the reaction itself and the phenomena of anaphylaxis. He shows it also from the results obtained by injecting mallein, sensitised in vitro, according to his own methods. The above (maleina sensibilizzata in vitro), whilst it causes glanders subjects to react, has absolutely no effect on the healthy animals. In the case of an anaphylactic manifestation this ought not to be so, because the sensitised mallein (prepared in vitro) contains anaphylactic toxin, the action of which is also resented by healthy animals.

The author also speaks briefly about serum diagnosis (agglutination and deviation of the complement), showing their insufficient practical value for the diagnosis of glanders, and advising that they be used as auxiliaries to the mallein test.

Speaking then of the bacilli in natural and experimental glanders in chronic and acute cases, he states that he has never succeeded, in his many experiments carried out in the Glanders Research Laboratory at Brian in isolating the bac. mallei. from the blood of a horse, whilst he has found it to be constantly present in glanders of the donkey, and in the blood of experimentally infected guinea-pigs.

He points out what an important contribution his researches are on the pathogenesis of glanders, upholding his view against that of many authors that the pulverisation and introduction of the bacilli of glanders into the trachea provokes local lesions in the lungs, sometimes accompanied by secondary lesions in the nasal cavity.

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* Conference held by Prof. G. Fiwzi at Cervignano, in the Conference Hall of the "Direzione di Sanita d'Armata." (Published by the same, Turin, Schioppo. 1917.)

On the properties of serum of animals hyperimmunised against glanders, and on the selection of animals for the preparation of serum rich in glanders' anti-bodies (E. Bertetti and G. Fiwzi, Extract from Vol. XXVI, 5th series, 2nd sem., 5th fasc. Rome, September, 1917.

Referring to the therapeutics of glanders, the author goes quickly over all the attempts made since 1880 to cure glanders, and explains his own experiments, all of which had a negative result, whether using carbolic acid and a solution of iodine and iodide separately or in conjunction, or whether using mercurial and arsenical preparations separately or together.

After that the author goes into the subject of the complete cure of glanders. On this subject he has carried out since the beginning of the war special researches, to which he also refers in his publication, "The Properties of the Serum of Animals Hyperimmunised against Glanders, and on the Selection of Animals for the Preparation of Serum rich in Glanders Anti-bodies." In the above mentioned researches, some of which are absolutely new to the study of the therapeutics of glanders, he deals with, respectively: (1) Toxin Mallein Therapy; (2) Vaccine Therapy; (3) Bacterio Toxin Therapy; (4) Sero Toxin Therapy; (5) Sero Bacterio Therapy; (6) Sero Therapy.

TOXIN MALLEIN THERAPY.

The author, in order to avoid several difficulties, prepares a mallein (Brian) of fixed and constant toxicity. The experiments which he made with this mallein to cure animals suffering from lung glanders show that recovery is possible when the animal is capable of producing a strong reaction and of producing many anti-bodies, that is, when the animal is in good condition.

He has cured in that way, and under the above mentioned conditions, a considerable number of animals (which had been suffering from glanders for several months), notwithstanding hard work and deficient feeding. These did not react any more to mallein, and did not infect the donkeys living with them.

When, on the other hand, the affected animals are thin or cachectical, and the disease advanced, toxin therapy is not indicated. But even in those cases in which the mallein treatment is possible, the author maintains that the use of mallein in the treatment of glanders will never be on a large scale, because the dose must be regulated by the condition of the animal, which is not possible in practice, and also because the animals under treatment must be looked after very carefully by experts, seeing that the overlooking of a single reaction may lead to the failure of the treatment.

VACCINE THERAPY.

The researches made on the vaccine therapy of lung glanders are entirely original. The author has used many strains of glanders bacilli of medium virulence as a curative vaccine. He has experimented on two different groups of horses with a vaccine sterilised by heat, and also with a vaccine sterilised chemically. A third group of horses were treated by him with mallein vaccine therapy. The results obtained led the author to the conclusion that it will be possible to cure the chronic forms of lung glanders. But both the above mentioned methods are contra-indicated in every form of acute glanders. Good food, strict attention to hygiene and rest, are necessary.

As for the methods of passive immunisation (serum therapy), although one has already tried to prepare an anti-glanders serum, no one has yet tried to hyperimmunise horses with dead or living bacilli of different degrees of virulence, either alone or with their toxins. The preparation of serum rich in glanders anti-bodies was tried by the authors from the donkey, mule, horse, and ox, and has led to really encouraging results.

The authors add that they have not hyperimmunised the animals with the hope of obtaining a serum possessing the preventive and curative properties, because they maintain that the serum is of no value for injections against infectious nodular conditions.

It was their intention to :—

(*a*) Use the above-mentioned serum, associated with mallein, in acute glanders with fever, and in which they had found toxin-mallein therapy contra-indicated.

(*b*) To prepare bacilli sensitised with the same serum, to diminish the strong reactions, both local and general, which usually accompany the injections of virus in the attempts at vaccine-therapy.

(*c*) To prepare a vaccine with mallein condensed and sensitised by means of anti-glanders serum, using the three methods, Besredka, Vallée, and Guinard.

The authors cannot yet declare the results of their experiments on horses suffering from lung glanders, but they can show—

(*a*) That the anti-glanders serum possesses strong precipitative qualities, much agglutinative power, and contains many specific bacteriolysins.

(*b*) That the serum that is richest in glanders anti-bodies is that of the ox, which has been hyperimmunised, and that the quantity of glanders anti-bodies is inversely proportional to the degree of resistance against glanders possessed by the animal producing the serum.

(*c*) That the mallein shows itself to be incapable of real immunising action. The animals treated with the injections of mallein associated with bacteria give a serum which is far less rich in anti-bodies than the animals treated with bacilli alone.

EFFECTS OF ASPHYXIATING GAS ON THE HORSE.

FRANÇOIS, writing in *Recueil d'Alfort,* tells of the effect of suffocating gas emitted from shells on horses that are in contact with more or less dense waves of gas. Following the accident the symptoms are very alarming; horses most affected hold down their heads keep their mouths half open, and the nostrils are dilated; they seem to seek a position which will assuage their sufferings; they lie down cautiously on one side then get up soon after; they seem to have all their senses. Respiration is dyspnœic, short, hurried; the heaving of the flank marked; the number of respiratory movements is 90 to 110 per minute; groan at each respiration; dry, abortive cough, frequent, as in broken wind. Light, frothy discharge, blood-flecked from nostrils. Depressed pulse, 50 beats per minute. The pituitary membrane is pale, slightly saffron-coloured, the conjunctiva the colour of wine dregs. No fever; at first the temperature is even sub-normal (36·5^8). Percussion is painful, but shows nothing abnormal. On auscultation, very pronounced bronchial râles; sibilant râles and wheezing noises at the entrance of the chest; later on quite a noticeable epidermic chill.

In spite of the gravity of the symptoms the sick horses soon chip up. Those least affected are cured in five days; the worst cases last about twelve days. After results are *nil.*

The difference of the gravity with which horses are affected is partly dependent upon the quantity of gas inspired, and partly on more or less violent muscular efforts made at the time of the accident, and which involve more frequent and full respiratory movements.

Treatment will be chiefly preventive and consists in the carrying of an appropriate mask. Certain army veterinary surgeons affirm that the use of a simple nose-bag or a simple net stuffed with damp hay is sufficient, with abstention from all muscular effort (immobilisation at the place or movement at the walk) to protect horses from grave attacks. Curative treatment will be simple: avoid useless disturbing of the animals; put them in dark places well aerated (forests), briefly, try to procure them the maximum of air possible. A full diet the first two days. Bleeding is useless; injections of caffeine practised in grave cases have not appeared to influence the course of the malady. All observations as regards inhalation of gas in horses have shown that they are less lastingly affected than man and the small animals, the dog in particular. François emits the hypothesis that the length of the trachea and the development of the branching bronchial tubes lessen the effect of the gases. G. M.

Abstracts.

PITFALLS IN CASTRATION.

By JOHN A. JAEGER, D.V.M.

Last spring while out castrating colts I drove into one farmyard where there were two colts to castrate. I castrated the first colt in the standing position without any trouble. I put the emasculator on the cord; the colt threw himself before I could get the emasculator off. He was on the ground, so I just let him fall with the emasculator on the cord, as I have done many times before. When he got up I took it off, and removed the other testicle without any more trouble.

The other colt was castrated in the recumbent position, because he was a high flanker on one side.

The next day the farmer called me up and said if I did not come and stop the first colt from bleeding he would certainly bleed to death. I went out and soon saw that it was not blood, but a serum oozing from the incision on the left side, this being the first testicle I took out when the colt threw himself; the other side was all right. I told the farmer that if the colt did not bleed faster than that, he could bleed all his life, and not bleed to death. The colt had no fever, so I advised that he be turned out to pasture. The next day I drove by, but the farmer was not at home. I took a look at the colt again. His belly looked considerably drawn, and his temperature was 102.6 degrees F. The serum was still oozing from the left side. The next day the farmer called me up again and said the colt was still bleeding. When I got there and saw the colt from a distance he presented the most perfect picture I ever saw of peritonitis. His temperature was 106°F, and his breathing was laboured; his abdomen was much tucked, and he would just stand still in one place and would neither eat nor drink. On making the colt walk, at intervals a clot of blood would fall from the left-hand cut about the size of a small hazel nut. To satisfy the farmer, I cast the colt and packed the left-hand cut with sterilised gauze; at the same time I knew that it was not going to remove the trouble. I knew also that the peritonitis was not caused from infection, as my instruments were sterile.

I left some stimulants and febrifuge, and told the farmer the prognosis was not favourable, and if the colt died, to let me know and we would "post" him and see if we could not find out the cause of death. I did not hear from the farmer the next day, but the following day he called me up and said the colt was down and could not get up. I told him to let him alone and to call me as soon as he died, which was the next morning. I went out and on "posting" I found about one and a-half gallons of blood-clot in the abdominal cavity. On looking further I found that the left spermatic artery was ruptured about half way between its origin and where it goes into the inguinal canal. The internal inguinal ring was also somewhat enlarged. This artery was not bleeding but had healed. The intestines along the floor of the abdomen showed inflammation.

To this day I have never been able to induce the farmer to believe it was not my fault; and he always says if I had castrated this colt in the recumbent position he would still be alive. He also says he will never permit anyone to castrate another colt for him in the standing position. I castrate around 250 colts every year and this is the first one I ever lost from castration; and I have it charged up against the standing operation. Hereafter I shall castrate all colts in the standing position or all in the recumbent position on the same farm, and this pitfall will not occur again.

I think the time will come when the veterinary profession will abandon the standing operation. I believe it will redound to the credit of the profession. I am not saying this because I cannot perform the standing operation, as I have in the past used this method almost exclusively. But here is the way it worked with me when I came to this location. A quack here was castrating colts standing and used clamps, for a fee of $1.50 each. He was good at it. After getting $5.00 out West, $1.50 did not look good to me. I saw a lot of the farmers before castrating time and they all told me that if I did not castrate their colts standing, I could not do it for them. They also asked me what my fee was going to be. I thought it over, and then decided I would go the quack one better even if I lost a few colts the first year. I put the fee at $2.00. When a farmer would ask me my fees I would tell him $2.00. He would say, "Well, that is only fifty cents more and we want to keep you here, so go ahead." Then I would inquire how he wanted it done, and if he did not care, down went the colt; and when I had finished they would say, "That is the best job I ever saw done, and the only way it will be done hereafter." There is more work to the recumbent operation, but one can charge more, and the clients pay the fee without complaint.

The next year I charged $2.50 and got all the colts I wanted. Last year I charged $3.00 for the first one, and $2.00 for each additional colt on the farm, and never lost a client because of the charges. I castrated one straight colt last year that I charged $10.00 for, and the farmer never said a word when he paid me. It took about two hours to do the job, as we had to halter-break him first before I could get the harness on to him.

In the standing operation I can do the job if everything is all right and be back in my car in the time it takes me to put the harness on a colt. The standing operation is quicker and easier for the veterinarian, and that is why so many veterinarians get only a fee of $1.00, they don't make enough work out of it. The recumbent position entails more work, but if one gets extra pay that objection vanishes. —*Journal of A.V.M.A.*

GASTRO-INTESTINAL LAVAGE AGAINST WORMS.

Messrs. M. C. HALL, Ph.D.D.V.M., and MEYER WIGDEN, M.A., writing in the " Journal of the American Veterinary Medical Association " for January 1918, give the results of their experiments with gastro-intestinal lavage against worms in the dog. The method is to administer first a saline purgative, then free the bowels of all material with a gallon or two of soapy water until the fluid comes out of the mouth as fast as it runs into the rectum. After flushing the dog with the soap solution, he is then freely flushed with normal saline solution. The injection of the fluid is perhaps best accomplished by gravity, using a funnel and tube, but a force pump and city water pressure have also been used.

The authors experimented on nine dogs and conclude that gastro-intestinal lavage, like most of the medicinal anthelmintics, has not the entirely dependable efficacy which is usually credited to it by those who use it ; it may be useful as a mechanical aid to the removal of worms but its value is less than that of properly selected medicinal anthelmintics in suitable doses.

It is of great value in cases of poisoning in dogs and cats where lavage can be given in time to wash out some or all of the poison from the digestive tract before the absorption of a lethal dose.

It is easy and rapid with some dogs, but slow and tedious with others. Difficult cases may be given 1-20th to 1-10th grain of apomorphine hyd., before injecting, and afterwards the fluid generally comes right through..—G.M.

Since recording the cases of " Toxic Enteritis and Constipation in the Dog " in the VETERINARY JOURNAL, for April, 1915, p.p. 186-187, we have used lavage on two dogs brought to the infirmary for suspected poisoning (mineral) and on two suffering from toxaemia and digestive trouble. The results in all four cases were good. We, however, strongly recommend *the medicinal paraffin treatment along with lavage.* The two agree well. We have been wondering whether, if liquid paraffin had been used in the above experiments along with lavage, the treatment might not have been more effective against worms.—(SUB-EDITOR V. J.)

CRYPTORCHIDISM TREATED MEDICINALLY.

MART R. STEFFEN, writing in the *Journal of the American Veterinary Medical Association,* says:—

In veterinary practice animals, more particularly horses, in which the descent of one or both testicles into the scrotum has not taken place normally, have always been considered solely from the surgical standpoint. No effort to correct the condition has been made from a medical standpoint. Usually the colt in which a testicle does not come down into the scrotum by the time it has reached the end of its second year of life is considered a confirmed " ridgeling," and a case for the surgeon only.

This is not as it should be if the experience of human medical practitioners can be applied to veterinary subjects. Human beings with an undescended testicle are treated medicinally, and frequently the results are all that can be desired.

There is no very evident reason why veterinarians should not attempt the correction of this abnormality in colts by the use of proper medical treatment.

Just exactly what this proper medical treatment would be is not so plain, but in human subjects some fine results have followed the administration of thyroid extract. This treatment has been used successfully for defective children.

I would recommend that the same treatment be used in colts. The administration of the thyroid extract should be commenced just as soon as it is evident that the colt is tardy in effecting the descent of one or more testicles.

We have every right to expect good results from this treatment in horses, because everything points to a deficiency of some vital secretion or function in cryptorchids. Ridgelings are really defectives. They are imperfect in physical development and their temperament is usually erratic. These imperfections cannot reasonably be attributed to failure of the testicles to descend normally.

The failure of the testicles to descend in a normal manner is more apt to be due to this defective condition, contrary to popular belief. Just why thyroid extract should be indicated for the correction of this abnormality is not easy to explain, and I recommend it only because it has given good results in similar cases affecting human subjects.

The important item to bear in mind is early diagnosis. To bring good results treatment must begin before the tendency toward cryptorchidism has been made permanent by the development of structures concerned in the phenomenon.

The successful treatment of this abnormality by medicinal means would be of especial value in cases occurring in pure-bred males whose procreative ability is desired.

A DELUSION THAT DIES HARD.

In a recent number of a certain publication there is a report headed "Ruptured Stomach." The case was a 1,500 pound grey gelding, and when first seen by the doctor he was walking round his stall and vomiting every few minutes. Temperature normal; pulse hard and fast; respiration fast and laboured.

Diagnosis.—Rupture of the stomach. By giving a dose of lobelin sulphate the pain was abated for an hour, and then the vomiting commenced again. Now was this a case for lobelin sulphate or was it a case for the stomach tube? Supposing the late Dr. Knisley had read this article, what would he have said? It is almost enough to bring him back.

After a stomach has ruptured will a horse vomit? Of course he will not—because he cannot; and yet here was a report of one doing that very thing. Lobelin sulphate is all right in its place, but it certainly has no place in a case of this kind.

The doctor gave the horse arecolin under these conditions, and told the owner that the horse would probably be dead by morning; he posted the horse next day, and sure enough there was a rupture of the stomach. What else could there have been?

It is further stated that lobelin sulphate relieves excitement and spasms quickly, and that is where we make an impression with the owner. If a stomach tube had been used and the horse saved for the farmer, would it not have made a good and lasting impression? Is it impressions or good results that we want?—*A. J. V. M.*

Major L. A. Merillat, the author, and Professor of Surgery in the M'Killip Veterinary College, writing to *The American Journal of Veterinary Medicine*, says:—

"I have been assigned to a large veterinary hospital overflowing with patients of all sorts, but chiefly with the great war scourge we have heard so much about since hostilities began, namely, mange. The rest are but the usual array of miscellaneous patients one would expect to find where horses are congregated in large numbers: poll-evil, quittors, fistulæ of the withers, lacerated wounds, necrobacillosis, three distinct kinds of lymphangitis, and the usual locomotor infirmities. There are no new problems the American Veterinary Service will not be able to manage, except possibly lymphangitis.

"There are two ways in vogue of handling mange—the dipping vat and the sulphur fumes chamber. The former was preferred by the English and the latter by the French. In this respect we are still non-committal, and shall remain so until both methods have been given a fair trial in our own service, where daily observations can be made on a large number of subjects and checks. I have not been yet convinced that the old hand treatment is not as good as any where help is abundant and pains are taken to apply the parasiticide everywhere, and as thoroughly as possible. The dipping vat, of course, gives the best result where help is scarce, but, after all, I have already found that this, too, is not as effectual as one would desire when animals coming out are not immediately rubbed well, and at every part of the body to make the dipping solution enter into the skin recesses. Mere dipping is worthless, or at least almost worthless without this good rubbing, and since the immersions must be repeated six to eight times at intervals of four to eight days, the need of the hour is a more rapid method of cure.

"Whatever form of treatment is decided upon it must always be preceded by a thorough washing of the body to remove the scales and scabs. If this is done well the selection of the parasiticide is less important if rubbed in well and over the whole body, including no less than six inches of the root of the tail. Our experiments with hand treatment administered side by side with the others will be reported later, when enough comparative tests have been made to justify a statement. And of course no treatment amounts to much unless re-infection is prevented. Mange is a mighty disease. It is a fell scourge. Its control is of capital importance. Left unchecked it pesters, emaciates, destroys, and would in itself demoralise any service needing horses.

"Having now had the pleasure of observing the veterinary service from Missouri to the trenches I am supremely content with my military service, and, come what may, I shall always feel the sacrifice has not been in vain."

CATTLE-POISONING BY WATER DROP-WORT.

We have received from Mr. C. B. Moffat, of Enniscorthy, a note written at the suggestion of Mr. R. J. Moss, Registrar of the Royal Dublin Society, in which the question is asked, "Is *Oenanthe crocata* wholesome food?" The question is put owing to the fact that about a month ago Mr. Moffat had occasion to observe a herd of cows browsing on this plant, and had been able to satisfy himself that no injurious effects resulted. As he justly remarks, the records of death from eating this plant leave no doubt as to its usually poisonous character. He cites a case, investigated by Mr. Moss in 1917, in which roots of this plant were found among the stomachic contents of four cows found dead on land that had been flooded. He is, therefore, led to enquire whether the poison is confined to the roots or if at particular seasons or in particular localities the green parts of the water drop-wort are innocuous? Cornevin ("Plantes Vénéneuses") has stated that this plant, on which animals readily browse, leads to cases of poisoning every year; that all parts of the plant are toxic, the root being particularly so; and that drying does not destroy the noxious principle. Holmes (*Pharm. Journ.*, 1902, p. 431) refers to *Oenanthe crocata* as perhaps the most dangerous and virulently poisonous of our native plants. Long ("Plants Poisonous to Live Stock," p. 37) has more recently cited a formidable number of specific English instances confirming the judgment of Cornevin and Holmes. Nevertheless, notwithstanding the silence of these distinguished authorities on the point, the question raised by Mr. Moffat is not new. So long ago as 1845 an authority so eminent as the late Sir Robert Christison ("Poisons," p. 860) explained that while this plant has usually been held to be one of the most virulent of European vegetables, and seems well entitled to this character in general, yet climate or some other more obscure cause renders it inert in some situations. As Christison pointed out, the plant has been the subject of an uninterrupted series of observations since 1570, when Lobel directed attention to its poisonous properties. These observations show that in France, Germany, Holland, Spain, and various parts of England so far north as Liverpool, it is actively poisonous at all seasons of the year. Yet the careful experiments undertaken by Christison, while proving the virulence of the plant as grown near Woolwich and near Liverpool, showed that the same species as grown near Edinburgh is devoid of toxic properties. It is singular that little more is known now than Christison knew, and it is to be hoped that those competent to deal with the matter may be induced to undertake the research which is required to settle the questions raised by Mr. Moffat's confirmation from County Wexford of Sir Robert Christison's experience of three-quarters of a century ago as regards Midlothian.—*Nature.*

Correspondence.

In a letter to Mr. Horace L. Roberts, F.R.C.V.S., Dr. W. L. Williams, of the New York State Veterinary College, says:—"What you have told me regarding the entanglement of the thick umbilic cord as a cause of dystocia in the mare is very interesting. I shall make a note of this for future use. I note also what you say regarding the necrotic vaginitis. It appears that English veterinarians see a good deal of this trouble. I have observed a few cases, but not enough to get a clear idea of the cause. I am watching the literature from Great Britain rather closely, hoping to get the matter cleared up in my mind."

Personal.

Lieutenant-Colonel T. B. Wolstenholme, R.A.M.C. (T.), of Urmston, Manchester, has recently been awarded the Croix de Guerre; he is the son of Mr. John B. Wolstenholme, F.R.C.V.S., of Manchester.

Obituary.

HENRY SMITH, M.R.C.V.S. (WORTHING).

Mr. Henry Smith, the well-known Sussex veterinary surgeon, died at his residence, Winton Lodge, Worthing, on June 27th, 1918, aged 56. He was the younger son of the late Dr. Samuel Smith, of Winchcombe, Gloucestershire. Educated at the Cheltenham Grammar School, he graduated at the R.V.C. London in July, 1884, being a prizeman and medallist of his year. He had practised in Worthing and Sussex for 32 years. He was Veterinary Inspector to the County Council for the Worthing Division of Sussex, Veterinary Surgeon to the Worthing Corporation, Inspector under the Board of Agriculture, and Vice-President of the Southern Counties Veterinary Society.

He was a skilled canine surgeon and an active member of the many horse and dog shows held in Worthing. He was well known all over the county and beyond for his professional skill and genial and pleasant manner. He was perhaps one of the first men to use chloroform in dog practice. He leaves a widow, two sons and three daughters, to whom much sympathy is extended. The elder of his two sons, Mr. Sam Smith, M.R.C.V.S., is following in his father's footsteps, and the younger is a Lieutenant in the Royal Sussex Regiment.

CAPTAIN A. R. ROUTLEDGE, F.R C.V.S. (LOUTH).

The profession will learn with deep sorrow of the death of Captain Routledge. He was the son of Mr. James Routledge, J.P., and was born at Jarrow and educated at the Kepier Grammar School, Durham. He graduated at the Royal Veterinary College, Edinburgh, in May, 1895, and took the 2nd Fitzwygram prize in that year. He took his Fellowship degree on May 16th, 1903. He succeeded Mr. G. H. Kitchin, M.R.C.V.S., at Louth, on November 28th, 1906, and built up a large and successful practice, winning the esteem and regard of all classes. At the outbreak of war he answered the call of duty, joining the A.V.C., and serving from August 9th, 1914, until invalided out of the army, through ill-health contracted on active service, on April 10th, 1918, and died in the 4th Northern General Military Hospital, Lincoln, on June 27th, 1918. He was greatly esteemed by his comrades in arms, and was a smart and efficient officer and veterinary surgeon. In civil practice he held the appointments of Inspector to the Parts of Lindsey, and the Board of Agriculture; Veterinary Surgeon to the Lincolnshire Agricultural Society; Examiner to the Worshipful Company of Farriers. He took a post-graduate course in Pathology in July, 1913. He was an active, energetic worker in his profession, lived for it and loved it.

During his army career he commanded a veterinary hospital at Bury St. Edmunds and in another part of Suffolk, and later on was entitled to wear two blue chevrons on his sleeve for service in France. His was a fine character, and he set a splendid example for others to follow. Ever ready to help on the work of his profession, he died all too soon, and at the age of 44 has left us all the poorer. The funeral service was held at the Parish Church, and he was buried with full military honours at the cemetery. Many members of the Town Council and a host of personal friends and local agriculturists attended the funeral to bid their last farewells.

He leaves a widow and young daughter to mourn his loss, for both of whom deep sympathy will be felt.

Reviews.

VETERINARY SURGICAL OPERATIONS. By Major Louis A. Merillat, Sr.V.S., V.C., U.S.A., Professor of Surgery in the Killip Veterinary College, Secretary of the A.V.M.A., etc. Second edition, revised and enlarged. Published by Alexander Eger, Chicago. 1918. Price 25s. net. London agents: Messrs. Baillière, Tindall & Cox.

The first edition of 3,000 copies of this book has been rapidly exhausted, and the second edition just out has been brought up to date, enlarged, revised, and partly re-written, and fifty new illustrations and four full-page plates added. Major Merillat has a big reputation in America as a veterinary surgeon, gained through great operating experience, and this work is full of good things and such a one as might be expected from a master of the subject. It is the third of the volumes on veterinary surgery produced by the author, the others dealing with "Animal Dentistry and Diseases of the Mouth," and "Principles of Veterinary Surgery."

The Professor's recipe for an ideal surgeon (and we write *ideal* because we know many good veterinary surgeons that lack some of the attributes) is that he should possess "theoretical knowledge, inventive genius, and practical adaptability, and be primarily keen on attention to detail. He must possess the health of an athlete, the strength of a giant, the manipulative dexterity of a magician, and the skill of an artisan." There are other attributes the professor enumerates, but these will do to be going on with. There are thirteen chapters in the book dealing with the daily surgical work to be undertaken in a large clinique—castration and spaying fistulæ, throat operations, neurotomy, hernia, special amputations, choke, etc., and many minor operations and operations due to accidents are fully described. The book throughout is exceedingly well illustrated and one virtue in the text is that it is not always assumed that every surgical operation has a successful issue. The untoward results and accidents that may occur are given their proper place, and in many cases illustrated and described.

In a book where all the matter is good it is, perhaps, invidious to single out any one chapter for special commendation, but we think the pages on hernia are the plainest and most concise we have ever read. The volume may be accepted as a really first-class text book by the operating surgeon. The binding and finish of the work are beyond praise, and such as we seldom get in this country in connection with scientific books. We notice that the flank operation for ovariotomy is not described.

The Major makes three statements that will, perhaps, upset the men who believe that to doubt the orthodox faith is rank heresy; but it is evident that they are thoughtful statements, and therefore entitled to respect. They are as follows:—

(1) In castration—standing—" The near testicle is selected first, contrary to the custom of many experienced veterinarians, because in our hands this plan has yielded fewer narrow escapes from personal injury. Horses are more likely to kick while the second testicle is being removed than the first, because they are now on their guard, expecting a repetition of what has just occurred, and as they usually kick with the leg on the side injured, the danger is very materially lessened."

(2) Castrating cats.—" On account of the difficulty of coping with the feline gymnastics provoked by the restraint, and the operation itself, the castration of cats is not a popular operation." Well, we know veterinary establishments and colleges where all the tom cats for miles around have been castrated and most of them free of charge. Again, the operation is not a screeching, scratching fighting affair if one puts a leather hood over the cat's head, and gets a handy man to hold the feline. The chief difficulty with amateurs is to avoid cutting a tabby.

(3) This will greatly upset the elect, especially of the stiff and settled school. In *docking*, " it is not necessary to search for an intervertebral articulation through which to make the amputation; on the contrary, *section through a segment* [the italics are ours] *is more desirable*, because the exfoliation of the end of the segment will be more rapid than if the bi-section had been made through an articulation."

There are two tips (among many others) in the book worth remembering and trying by British veterinarians—(1) " The best remedy to inhibit the spread of *grease* that we have found is methylene blue and tannic acid, two drachms of the former in one gallon of a saturated solution of the latter. This is rubbed briskly into the affected skin twice a day. (2) After evacuating *a capped hock* use injections of 1 in 1,000 adrenalin chloride solution, and wad the wound. A very effective injection is also 2 per cent. methylene blue which arrests secretion and promotes prompt cicatrisation. G. M.

A TEXT BOOK OF THE PRINCIPLES AND PRACTICE OF VETERINARY MEDICINE.—By David S. White, D.V.M., Dean of the College and Professor of Veterinary Medicine in the Ohio State University, Columbus, Ohio. pp. 484, including index. Price 13s. net. Lea and Febiger, Philadelphia and New York.

THE fault of this book is that too much has been attempted in too little space—the result is that the matter is quite too superficial for the professional and quite too mystifying for the amateur. A book that claims to be scientific and up-to-date ought not to omit a consideration of the diseases of the dog and cat when discussing veterinary medicine. As a reminder of remedies and summary of supposed causes of disease it may be useful, but the peruser who follows its advice in the field will soon convince himself that a little knowledge is a very dangerous thing. Incidentally he might come to the conclusion that a case of laminitis was one of tetanus or pneumonia because laminitis is not mentioned at all in the book.

Criticising some of the statements in the work we do not believe that continued severe exercise is a cause of broken wind. It is stated that fluke in sheep cannot be treated effectively by medicine. Up-to-date knowledge ascribes very valuable results in this disease by treatment with oil of male shield fern (see French and other experiments). Even in the case of azoturia the up-to-date American treatment with oxalic acid is not given. Three per cent. sulphuric acid will not kill coccidiæ in faeces; the pure acid is necessary. In tuberculosis of the horse a prominent symptom is stiffness and often tenderness of the cervical vertebræ. This is not mentioned. Broncho-pneumonia in our experience is more common in the horse than in ox, sheep and swine. The author believes otherwise. The chapter on "Diseases of the Organs of Locomotion" is quite too anæmic or skeletal and almost useless to "the student, practitioner, investigator and intelligent stockman."

The best use for the book is as an "aide-mémoire," but the memory needs to be mature and discerning. G. M.

NOTICES.

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The Late Captain A. R. ROUTLEDGE, F.R.C.V.S.,
Louth.

The Late HENRY SMITH, M.R.C.V.S.,
Worthing.

THE

VETERINARY JOURNAL

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

SEPTEMBER, 1918.

Editorials.

THE VETERINARY STUDENT, AND HIS VALUE TO THE COUNTRY.

AT the present moment there are about twenty or thirty veterinary students serving their country in the British Army as combatant officers or men, some even being in infantry regiments where their knowledge of horsemanship is of no value and cannot be utilised; and it seems a great waste and want of economy that they should not be returned to their studies, and so emerge as officers in the Army Veterinary Corps, where they are so much needed. It is not sufficient that the third and fourth year students have been allowed to return, as the first and second year men should also be allowed to do the same. In this connection America has given us a good lead, for by their new regulations governing voluntary enlistment in the Enlisted Reserve Corps of the Medical Department any veterinary student is allowed, after enlistment, to carry on with his studies. It is, however, only done, as stated in the Order, with the idea that he shall be of more use to the State as a qualified man, and that as soon as he qualifies he places his services at the disposal of the Army. That every true man would always do when his country was in danger goes without saying, but they should always be given where they are of the greatest value, and no one will attempt to deny that as a qualified veterinary officer he is of more service to the State than when merely serving in the ranks. Our Council should read the Regulations (published in our columns) governing Voluntary American Enlistment, and an attempt should be made on similar lines to permit the return to their studies of all legitimate veterinary students, registering them for immediate service if necessity arises.

Thirty or forty men, more or less, count for nothing in the combatant service; but thirty or forty fully-qualified men would mean all the difference in a department like the Army Veterinary Service between scarcity and sufficiency.

Most of the men thus serving are willing to return if permitted; and there can be no question that if permission was granted, and they qualified in due ccurse, they would be a hundred times more useful and valuable to the country both now and in the future.

THE NECESSITY FOR ECONOMY IN REGARD TO HORSES AND MULES.

A NEW order has been recently published in Italy in regard to the horses, mules and donkeys of that country whereby these animals may not be slaughtered for food until they have been certified as being unable to be used either for work or for breeding purposes, and this verification must always be made on the word of a duly qualified veterinary inspector.

It is interesting to note this step taken by our Ally, as it shows that a necessity for economy in this direction exists, and it also again draws attention to the fact that the flesh of these animals is an important item of food. "Coming events cast their shadows before," and it makes one wonder whether or not the time will come when we, too, shall have to pass a similar law. The flesh of the horse and mule is a very good food, and a horse or mule sent to the butcher in France or Italy fetches a price undreamt of in England—often more than £40; frequently three or even four times as much as the animal would fetch in a sale; and judging from the valuable use made of it as a foodstuff by other European nations, it is a point worth consideration whether our insular prejudice does not cause us much economic wastage and monetary loss.

AWKWARD CLIENTS AND INCREASED FEES.

IN every veterinary practice there are certain individuals who may be classed as awkward clients, difficult to please or to satisfy. There are also thoughtless, vindictive, or directing clients and suspicious and densely ignorant individuals. Most of us have had experience of the fellow that always calls on us at meal times because he says he knows he will find us in; he is quite unconcerned as to whether his requests will take three minutes or thirty to fulfil; he is one degree more considerate than the chap who rings us up or knocks loudly on our door at 4 a.m. to tell us that a patient we have been attending is dead. The lady who wants to talk for half-an-hour on canine ailments in general and her own pet's indisposition in particular has as true a sense of proportion as the naturalist who takes a musket to kill a butterfly. An ever probable thorn in the side is he who tries to work on an operator's fears by telling him if certain possible things happen he will hold him responsible and visit him with divers pains and penalties. The man who knows how things ought to be done and intends telling you with Tom Foy-like persistence is quite a common bird. The suspicious man who thinks you are doing one job in order to make two has probably spent his life chiefly with plumbers or slaters. The man who wants you to aid and abet all the mysteries of the dark ages and is willing to pay you quite well for introducing an idea or two of your own as a side line is also well-known. The real bad man is not very plentiful, but now and again a client by lies or perverseness tries to do you out of the just reward of your labours. The petty mind is occasionally found among the ladies, where the sixpenny doctor is quoted against you and your charges, or a reduced fee or none at all offered because a whippet's fractured leg has not set quite straight even when the original injury may have been a compound, comminuted one. At the present time, and indeed at all times, clients like these, if attended to, ought to be charged more than reasonable folk, and while not entirely believing in the aphorism, "swallow their insults and pocket their brass," yet the brass side of the question needs consideration. In all spheres of labour men never strove more than at the present time for decent pay and reasonable conditions of life and work. Perhaps there was never a better time to educate one's clientèle nor to secure adequate remuneration for services rendered. The prices of all live stock have increased enormously in value but as a set-off against this the number has decreased. A £16 pre-war cow now costs £60, an £80 cart horse £160 to £200. The Veterinary surgeon's fees in many cases remain the same, and insurance companies still offer a miserable 3s. 6d. or 4s. for the examination of such subjects. The cost of living has increased enormously and the veterinary surgeon is entitled to live, not merely to exist. The worst breach of professional etiquette that can happen to-day is perhaps to undercut a professional brother in charges or do work for tradesman's (and in many cases less than tradesman's) fees. Castrations at 5s., examinations for soundness at 7s. 6d., surgical operations at 2s. 6d. are all out of date. It is the man whose ideas never rise more than one degree above the poverty line that most tends to keep the profession down to-day.

G. M.

Original Communication.

VETERINARY SERVICE IN THE AMERICAN ARMY AND THE DUTIES OF VETERINARIANS DURING THE WAR PERIOD.

By CHARLES E. COTTON, Major, V.C., N.A.

The veterinary service of our army for many years was never organised. It consisted largely of civilian veterinarians employed by the Quartermaster Corps under contract. In 1900, the veterinarians attached to regiments of cavalry and field artillery were given the pay and allowances of second lieutenants, without privilege of promotion or retirement, and the Quartermaster Corps still continued to employ a considerable number of civilians for duty at corrals and depots. No enlisted men were provided, and the professional standard of veterinarians in many cases was low, with neither opportunity nor encouragement for improvement.

The American Veterinary Medical Association and members of the profession had made persistent efforts in Congress to secure adequate legislation for the army veterinary service, but without encouragement or success. Even the lessons of the Spanish War, which taught the need of an organised service, were soon forgotten, and it was not until June 3rd, 1916, that Congress passed an act giving veterinarians commissioned rank up to and including that of major, and providing the establishment of a veterinary corps in the medical department of the army.

When the present war broke out, there were only 58 veterinary officers in the army, and they were assigned to mounted regiments. There was no enlisted personnel, and no definite plan for organisation. The Secretary of War decided that the Overman Act of May 18th, 1917, furnished authority for the necessary organisation during the present war. Major-General Gorgas, surgeon-general of the army, immediately took steps to place the corps under proper organisation, and on an efficient basis of expansion. A number of the army veterinary officers and civilian veterinarians were called to Washington to devise a plan of procedure. The matter was referred to the general staff, and after an extended study a general order of the War Department, No. 130, dated October 4th, 1917, was issued, and on this order was based the present organisation. Authority was granted for one veterinary officer and sixteen enlisted men for each 400 public animals, thus placing the corps on a percentage basis. Special regulations, No. 70, for the government of the army veterinary service, and a guide for the use of veterinary officers, were written in the surgeon-general's office. After some delay, on December 15th, 1917, the regulations were made a special order by the Secretary of War.

Lieutenant-Colonel J. J. Aitken, of the British army veterinary service, arrived in November, 1917, and remained in the office of the surgeon-general for five months. He was sent as a representative of the British veterinary service, and as an adviser, in order that we might secure the benefit of the experience of the British service and his personal training. He was of inestimable value in perfecting the details of the organisation. A set of blank forms were devised for routine reports and returns. A number of official and educational circulars have been published to veterinary officers, instructing them in the performance of their official duties, and in the treatment, control and eradication under service conditions of glanders, influenza, skin diseases, etc.

The functions of the veterinary corps are to prevent inefficiency in public animals, to render professional treatment to the sick and injured, to organise and operate veterinary hospitals, to evacuate sick and wounded animals from the firing line to the hospitals in the rear, to furnish veterinary supplies, to inspect meat and dairy products, to make recommendations on matters pertaining to sanitation and the control of preventable diseases among public animals, and to furnish and instruct personnel, both commissioned and enlisted, for carrying out these operations.

For the performance of these duties, the corps now consists of one lieutenant-colonel, 47 majors, 96 captains, 395 first lieutenants, and 966 second lieutenants, a total of 1,505 commissioned officers and 9,000 enlisted men. The authorised strength is 18,000 officers and men. In order to receive a commission, a veterinarian must be a graduate of a reputable veterinary college, and must pass an examination in veterinary subjects, as well as the physical examination required of all commissioned second lieutenants in the reserve corps. These veterinarians are left in civil life until their services are required, when they are called to active duty. This list became so large that it has been necessary to suspend examinations of civilians temporarily. Veterinary graduates, who have been enlisted as privates, or in the medical reserve corps, are given a chance to take the examination for commissions, and, if qualified, are assigned to duty as officers when a vacancy occurs. The standard of men being commisioned is improving all the time.

Every division of troops, before going overseas, has a complete veterinary personnel of 12 officers and 51 enlisted men, organised, equipped and supplied before sailing. Thus far, 44 completed divisional organisations have been formed in this country. The division veterinarian, who is responsible for this service, is attached to the staff of the commanding general. He has, as assistant, a veterinary officer, trained in meat inspection, for the examination of all meat and dairy products used by the troops. Attached to each division is a mobile veterinary section, consisting of 21 men, equipped and trained for the removal of inefficient animals from the divisional units to hospitals. These mounted men will have stations near the front, where sick and injured animals will be collected, given the necessary first-aid treatment, and then removed to the hospitals on lines of communication. This service is of vital importance in preventing unnecessary suffering, conserving animals, and sustaining the efficiency of the fighting units.

At each auxiliary remount depot, operated by the Quartermaster Corps, are maintained 6 veterinary officers and 75 enlisted men. A remount depot is placed at each division camp, for the assembling of animals after purchase, and where they are kept until ready for issue to troops. Sick animals from the division camp, and from the auxiliary remount depot, are cared for in the veterinary hospital at the depot, which is organised and administered by the veterinary detachment. The veterinarian is also responsible for making proper recommendations for the improvement of the sanitary conditions surrounding the animals. A similar service is maintained at the animal embarkation depots.

Weekly telegraphic reports are received from division veterinarians, and the veterinarians of auxiliary remount depots, relative to the number of non-effective animals, the presence of communicable diseases, and the death rate. This report was instituted in December, 1917, and the veterinary corps takes pride in showing the improved condition and increased efficiency which are apparent from the following figures :—

	December 15, 1917.	June 1, 1918.
Total number of animals ..	213,803	269,779
Total non-effective	20,513	12,323
Percentage non-effective ..	9.05	4.56
Deaths	961	194
Percentage of deaths	·44	·071

The total number non-effective includes hospital cases and those in convalescent corrals.

Veterinary service is also supplied to all regiments of cavalry, artillery, and all other mounted troops scattered throughout the country, and to military posts having sufficient animals to warrant same.

Fifty veterinary officers, and an equivalent number of enlisted men, are on duty with the subsistence division of the Quartermaster's department. This division buys all meats and meat food products issued to the army by the Quartermaster's department, both in this country and abroad, and the entire inspection is being handled by veterinary officers. This consists not only of the selection, inspection, covering, storage and shipping of refrigerated beef, but also the selecting of material and following it through the entire processes of canning, smoking and curing as regards canned meats, bacon and ham. This is one of the most important duties of the veterinary corps, and an enormous amount of work has been efficiently handled to date, and without complaint. Veterinary officers are also sent to Chicago for training as meat inspectors for each division and camp as required

An army veterinary laboratory has been established at Philadelphia, Pa., and is doing important work in investigating animal diseases encountered in the service, and in trying out various lines of treatment. An army veterinary officer trained in this work has also been sent to each of the department laboratories in the United States for the purpose of making blood tests for glanders, dourine and other diseases, and for general veterinary laboratory work.

At the ports of embarkation, a veterinary officer is in charge of sanitation of the transports used in shipping animals abroad. A transport veterinarian is also provided for each boat, who is practically in charge of the shipment.

Five general veterinary inspectors are assigned to different zones in the United States. Their duties are to inspect the division camps and auxiliary remount depots, instruct the veterinary personnel, and to improve the local veterinary conditions wherever possible. They also inspect the rest and feeding stations in stock yards of the railroads, and stables which may be used in the transportation and purchase of public animals, and direct the sanitation, cleaning and disinfection of same. These inspectors work under direct orders from the surgeon-general's office, and are free from the control of local commanders and quartermasters.

Veterinarians are on duty with the purchasing boards maintained by the Quartermaster Corps, and no animals are bought unless passed on and given the mallein test for glanders by these officers. They also supervise the sanitation, cleaning and disinfection of stables and stock yards, which are, or may be, used for the collection and transportation of public animals, or animals intended for presentation to purchasing boards. They are thus not only reducing the animal inefficiency in the army, but are advancing the livestock interests of the country at large.

Since the outbreak of the war, the supply branch of the surgeon-general's office has laboured with the selection, standardising, furnishing and shipping of all veterinary supplies used by the army. These comprise medicines, dressings, bandages, instruments, hospital equipment, animal ambulances, and a multitude of articles required for the modern treatment of sick animals. The equipment and supplies, prior to October, were very meagre, and this work has had to begin at the bottom. The capacity of the manufacturers of this country has been strained to the limit in supplying many of these articles, but the supply system has now advanced to a point where all requirements are being fully and promptly met.

For the overseas service, there are to be provided, in addition to the veterinary service attached to each division, veterinary hospitals on the line of communications, and mobile hospitals, attached to army corps, for removing the sick and wounded animals. Some have gone and some are in training. The others will be formed as rapidly as possible. A veterinary training school has been organised at Camp Lee, Virginia, for the express purpose of receiving green men and training, equipping and instructing them, and organising them into these units. This school has a faculty of line officers for military instructors, and veterinarians for professional instruction, and aggregates about 1,800 officer and men at present. A modern veterinary hospital, in which the men can be trained to assist veterinary officers in practical work, has been approved from plans prepared in the surgeon-general's office and will, it is hoped, shortly be erected as an essential feature of this training school.

Other training facilities now afforded are in the veterinary section of the medical officer's training camp at Camp Greenleaf, Georgia, and Fort Riley, Kansas. At Camp Greenleaf, veterinary officers are given a two months' course in the duties of officers of the army. A class of 75 graduated in June. In the future, it is expected to graduate a class of 100 monthly. There are also about 250 veterinary enlisted men under training in this camp, and about 350 receiving instruction at Fort Riley. The latter place is especially desirable, since suitable men can be given a course in the school for horse-shoeing, cooking and baking, after which they are assigned to the organisations for overseas service. Horse-shoeing schools are maintained, in which a veterinary officer is the instructor. A veterinary officer, who is an expert horse-shoer and organiser, is going to the different camps as needed, and putting these schools on a better basis.

These observations indicate the activities of the veterinary corps to-day. It has a compact and comprehensive organisation, capable of expansion as required, a personnel which is steadily increasing in character and efficiency, and is rapidly rounding into an efficient unit.

The strenuous times now before our country require the accomplishment of many things which in peaceful days would not be required.

Carelessness in our every-day work might be overlooked in less important periods, but to-day, and, perhaps, for many days, we must exert all the forces which have hitherto been latent within us; we must give every possible minute of our time, our thoughts and our energy, to the end that the agricultural industry of the country may be better served and strengthened, and to the greater and consequent end that the country will be materially assisted in winning the war with the least possible expenditure of lives and time. This is no time to think of self. There are many and great things to be done, and every one must do as much as lies within his power.

As veterinarians, you are the rear guard for the food supply of those who are taking upon themselves the blows of an enemy.

Having wide acquaintance, and making daily visits to sections perhaps far apart, you are in a position to do a vast amount of educational work in overcoming pessimism, sloth and unwise propaganda. You are in a position to encourage and further stimulate the patriotic effort of the nation's feeders to build up an inexhaustible supply of food. We should keep in mind that each of us is endowed with the power to think, and we should concentrate that power on thoughts that may be of benefit to the nation, of which we are but atoms, yet capable, when welded together, of immense power.

As veterinarians your duty is plain, and, if carried out, will result in benefits accruing not only to your Government but to yourself. Two items of primary importance lie before you, *i.e.* the production and conservation of meat and milk-producing animals.

The various contagious and infectious diseases of livestock are a constant menace, and cause annually losses that are sufficient to feed our entire population. Many of these diseases are preventable by sanitation or vaccination. Your duty, in all cases of contagious and infectious diseases, lies in putting into use every measure known to science. If preventive treatment exists in the nature of serum or vaccines, it should be immediately applied, given unstintingly and with care. Reports of the existence of contagious diseases must be made known to those charged with their eradication and control, that repressive measures to prevent their spread may be instituted.

To permit a contagious disease to go unchecked is a crime against the nation. To neglect reporting to the authorities its presence so that its spread may be checked, is criminal.

Some of the contagious and infectious diseases are spread by the passage of animals through stock yards, and of the number disseminated in this way, shipping fever of horses, hæmorrhagic septicæmia, and hog cholera are the most important. These diseases can be prevented, to a great extent, by the use of serums and adequate sanitation. Veterinarians should warn shippers of the danger of infection during transit through stock yards. If no state regulations are in force which require the cleaning and disinfection of stock cars and stock yards, your association can perform a patriotic duty by petitioning the legislature, as a body, that such needed laws and regulations should be promulgated and enforced. Veterinarians should report to the proper authorities outbreaks of shipping fever in centres where horses or mules are presented to army purchasing boards. We realise full well that traffic in livestock must continue, but we can see that it is safe-guarded against disease.

In sections where black leg prevails, induce your clients to vaccinate their young animals. If it is suggested the advice comes from selfish motives, vaccinate free of charge, and try to establish in the minds of owners that you are working for their interests.

Advise against the sale of immature animals. Point out to the owners that, by a little extra time and effort, sufficient fodder can be obtained to finish the profitable growth of the animal. Impress upon them that young animals grow into money. Far better to dispose of one old animal which has outlived its value, and which depreciates yearly, than to dispose of one that increases in value with its growth.

Sanitation is becoming more and more important with our knowledge of disease. Thousands of young pigs are lost every year from necrobacillosis. There are three forms of this disease in swine: necrotic stomatitis, snuffles and necrotic enteritis. The loss in flesh of beef cattle, and the loss in milk from dairy cattle affected with foot rot, are large items. The loss of lambs from foot rot is extensive. All these conditions are due to the necrotic organism, and may be prevented by sanitation.

Advocate disinfection. It devolves upon you to give demonstrations in the method of disinfection. It may take time, but keep in mind that thousands of people are giving time, money and life freely in the present struggle.

The reward for good and patriotic work will come with the knowledge and consciousness of well-doing.

When peace again rules the world, the devastated countries must come to the United States for seed stock.

Enccurage and stimulate your clients to maintain and increase their herds and flocks. The future for the livestock industry of the United States is bright. We can well afford to be optimistic.

Belgium may come to America for breeding horses when the country again comes into its own. Holland, vastly depleted of cattle, may purchase Fresians in this country. The demand for meats by the now warring nations will increase, until such time as those countries can be restocked and are self-providing. Hence you may do your people and the Allies a great service by being prepared for such an emergency. It will be many years before the supply will keep up with the demand. In conclusion, be optimistic above all things ; the mental attitude of a man affects every one with whom he comes in contact. An optimist admits there is more or less trouble in the world, but he faces it without fear, and this attitude is infectious to others

An American soldier in France is said to have penned the following appeal to the people of this country : " In this renaissance of our country's valour, we, who will edge the wedge of her assaults, make calm acceptance of its hazards. For us, the steel-swept trench, the stiffening cold, weariness, hardship, worse. For you for whom we go, millions safe at home, what for you ? We shall need food. We shall need care. We shall need clothes for our bodies and weapons foı our hands. FROM YOU, who are our resources and reliance, who are the heart and hope of that humanity for which we smite and strive, must come these things."

A COMBINED NEURECTOMY HOOK AND KNIFE.

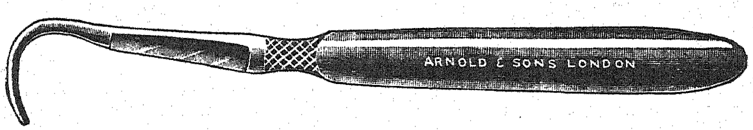
By CAPT. A. SAVAGE

(Canadian Veterinary Hospital, B.E.F., France.)

I am forwarding the illustration of a neurectomy hook and knife combined, which may interest some of your readers.

It consists of the usual blunt painted hook on the shaft of which is a cutting edge.

The method of using this combination is almost self explanatory.



The operator exposes the nerve in the usual way. He then elevates the exposed portion by means of the hook and severs its proximal end by a stroke of the cutting edge. This leaves the distal and insensitive part to be dealt with at leisure.

I have found the instrument very convenient especially when the patient is in the standing position.

It is made by Messrs. Arnold and Sons, to whom I am indebted for the block.

COPPER SULPHATE AS A DISINFECTANT AND GERMICIDE.

By CAPTAIN WATSON, A.V.C.,
Officer-in-charge. Veterinary Bacteriological Laboratory, B.E.F. France.

A FEW Laboratory tests have been carried out for determining the germicidal action of copper sulphate solutions.

Pure Phenol (Carbolic Acid) was used as a standard control.

A vigorously growing race of micrococci, obtained from a gunshot wound, was used as the test germ.

TABLE I.—Inhibition Coefficient.
(— = No growth of the bacterium.
+ = Growth „ „ „).

—	Strength of germicide (in nutrient broth).								
Germicide	1 : 100	1 : 200	1 : 400	1 : 500	1 : 1000	1 : 1500	1 : 2000	1 : 3000	Incubation at 37. C.
Copper Sulph.	—	—	—	—	—	—	+	+	7 days.
Phenol	—	—	—	+	+	+	+	+	„ „

TABLE II.—Lethal Coefficient.

—		Time of exposure, minutes.								Incubation.	
Germicide	Strength	2½	5	10	15	20	25	30		Time.	Temp.
Copper	1.0%	—	—	—	—	—	—	—		7 days	37. C.
Sulphate	0.5%	—	—	—	—	—	—	—		7 „	„ „
	0.2%	+	—	—	—	—	—	—		7 „	„ „
	0.1%	+	+	+	+	+	+	+		2 „	„ „
Phenol	1.5%	—	—	—	—	—	—	—		7 „	„ „
	1.25%	+	—	—	—	—	—	—		7 „	„ „
	1.0%	+	+	+	—	—	—	—		7 „	„ „
	0.5%	+	+	+	+	+	+	+		2 „	„ „

$$\text{Phenol Coefficient} \quad \frac{\frac{1.5}{0.5} + \frac{1.0}{0.2}}{2} = \frac{3 + 5}{2} = \frac{15}{2} = 7.5$$

The lowest percentage of Copper sulphate solution sufficient to prevent the growth and multiplication of the bacterium was found to be 1 : 1,500; and of Phenol 1 : 400. The *Inhibition* Coefficients were therefore :—

Copper sulphate	0·066
Phenol	0·25

The lowest percentage of Copper sulphate solution sufficient to kill the bacterium in 2½ minutes was 1 : 200, and in 30 minutes 1 : 500; and that of Phenol 2½ minutes 1 : 65; 30 minutes, 1 : 100.

The *Lethal* Coefficients were therefore :—

Copper sulphate ..	0·5	and	0·2
Phenol	1·5	,,	1·0

The *Phenol Coefficient* of Copper sulphate worked out at 7.5. That is to say, the relative lethal action of Copper sulphate compared with Phenol is as 7·5 to 1; and, for example, a solution of Copper sulphate 1 : 150 would be equivalent in germicidal action (under laboratory conditions) to a solution of Carbolic acid 1 : 20.

IS THE CAT REALLY A DEFINITIVE HOST OF *DICROCOELIUM LANCEATUM?*

A Note on some Flukes from British Guiana and the Malay States.

By R. T. LEIPER, M.D., D.Sc.
University Reader in Helminthology, London School of Tropical Medicine,

In the "Annals and Magazine of Natural History" for July, 1918, Mr. H. A. Baylis describes some flukes taken by Mr. G. E. Bodkin from the bileducts of a cat in British Guiana. These flukes bear a very marked resemblance to *Dicrocoelium lanceatum*, and Mr. Baylis is lead to the conclusion that, after all, the older helminthologists may have been correct in reckoning the cat among the hosts of *Distomum lanceatum*, as this species was formerly named. The forms described from the cat differed from the typical worms as seen in sheep in certain minor points, viz., the relative position of the testes to each other, the smaller size of the cirrussac, and the slightly larger average size of the eggs. On account of these differences Mr. Bodkin's flukes are regarded as belonging to a well-marked variety of *Dicrocoelium lanceatum* rather than a distinct form. This new find is accordingly named *Dicrocoelium lanceatum var. symmetricum*. As the original consignment of specimens was collected from a single cat it was considered doubtful whether the parasite should be regarded as a "local" variety, or as a form peculiar to cats. The author concludes an interesting and suggestive paper by observing that—"An examination of examples of *Dicrocoelium lanceatum* from sheep or other herbivorous animals in the same locality would be of great interest from this point of view as well as a further investigation of the parasites of cats." Mr. Bodkin has recently enabled me to make a study of this interesting form, having kindly forwarded several infested livers to the Museum of the London School of Tropical Medicine, through Dr. R. P. Cockin. The livers show gross pathological changes, similar to those which occur in sheep as a result of invasion of the bile ducts.

On opening the dilated ducts numerous flukes were found. These correspond in every respect with the description given by Mr. Baylis and in all the specimens the "abnormal" relation of the testes to one another is noticeable.

We conclude then that this type of worm is a frequent parasite of cats in British Guiana. On the other hand attention may be drawn to the fact that there are no well authenticated records of *Dicrocoelium lanceatum* in sheep or herbivorous animals in the New World. It is true that Leidy states that this species is common, with *Fasciola hepatica,* in the Western States of North America, but Stiles and other recent workers have failed to confirm this statement. It is similarly doubtful if the parasite is actually endemic in South America, for Dr. Kurt Wolffügel does not include this species in his monograph on "Los Zooparasitos de los Animales Domésticos en la Républica Argentina," published in 1911, and rejects Ferrari's mention of it, in 1910, as incorrect. There seems therefore little probability that the heavy invasion in the cats of British Guiana is attributable to infection from herbivorous animals.

Dicrocoelium lanceatum is a common parasite of sheep in Egypt. During my Bilharzia Mission there in 1915, I collected a large number of specimens at the abattoir in Cairo. In none of these have I been able to find that variation in the position of the testes which forms the basis of the variety *symmetricum.*

Dicrocoelium symmetricum cannot be merely a "local" variety, however. In 1910 I received from Dr. Wellington a small consignment of flukes found by him in the bileducts of a domesticated cat in the Malay States. These flukes also resemble *Dicrocoelium lanceatum,* but like the flukes from British Guiana, they differ in the same striking characteristic, the testes instead of being tandem are in the same transverse plane. In this, as in other respects, they resemble a somewhat smaller *Dicrocoelium* from a wild cat, *Viverra zibetha* (a native of India and Malays), which was described as a new species, *Dicrocoelium concinnum* by Braun in 1901.

If then the *Dicrocoelium* in cats is to be treated merely as a variety of *Dicrocoelium lanceatum* of sheep, the name *concinnum* must have priority over *symmetricum.* Further difficulties would however then arise, for in South American birds no less than six species of *Dicrocoelium* oc ur—viz. *D. deflectens, D. delectens, D. voluptarium, D. lubens, D. reficiens* and *D. illiciens.* These are all identical in the general arrangement of all their internal organs and differ only in the relative size of body, of oral and ventral suckers, of testes and ovary, and in the extension of the yolk glands. In all of them the testes are situated to each other as in the cat fluke, to which they bear a very close resemblance. They would therefore have to be treated as merely varieties of *D. lanceatum,* although recently they have been grouped into a distinct genus, *Platynosomum* by Looss. In the Far East the cattle are frequently found to have the pancreatic duct crammed with examples of two forms, named *pancreaticum* and *coelomaticum.* These parasites likewise closely resemble the sheep fluke *Dicrocoelium lanceatum,* but differ in certain minor points, particularly in the fact that the testes are not placed tandem but in pair. For these forms Looss created a special genus, *Eurytrema,* and, later, Railliet Henry and Joyeux added to it the species *Dicrocoelium concinnum.* Looss has, however, pointed out that this species has closer affinities to *Platynosomum.* If, then, *concinnum* is to be regarded as only a variety of *Dicrocoelium lanceatum,* so also must t ese other species of the genus *Eurytrema.* The same argument may be applied to *Mesocoelium, Lyperosomum, Brodenia,* and other genera of *Dicrocoelids.*

W thus arrive at the position that to accept the cat fluke as belonging to the same species as the sheep fluke would logically necessitate the complete abandonment of the modern principles of classification as applied to the whole group of genera which form a sub-family of *Dicrocoelidae,* and we should further have to decide not merely to replace the variety name *symmetricum,* by *concinnum,* but whether *concinnum* should not give way in turn to one of the above mentioned names of SouthAmerican avian flukes. On present knowledge I prefer to accept the view that (*a*) the sheep fluke does not use the cat as an alternative definitive host; (*b*) the flukes found by Mr. Bodkin and Dr. Wellington probably belong to a distinct species of an allied genus, viz., *Platynosomum,* and (*c*) the early record by V.-Siebold, etc., of the occurrence of *Dicrocoelium lanceatum* in the cat remains still an isolated, doubtful, and unconfirmed statement.

A CASE OF COMBINED MATERNAL AND FŒTAL DYSTOSIA.

By P. WILSON, M.R.C.V.S.
(*Lanark.*)

During this foaling season I was requested to attend a mare that was in labour. The messenger said she had been foaling for some hours, and only one foot could be felt.

On examination one leg could be felt in the vagina, and it proved to be a fore leg. A further examination revealed the presence of the head and another leg on the left side of the pelvis, but covered with what appeared to the touch to be a thick membrane.

My first impression was that they were enveloped in a fold of the placenta; however, a more careful examination proved this not to be the case. The head and foot were just inside the vulva, and on following them forward, the fingers, when introduced as far as possible, suddenly passed round a fold in the uterine wall, and came into direct contact with the leg at the elbow, and the neck of the foal.

They were lying in what one can only describe as being like a third uterine horn, lying in a backward direction. There was no chance of manipulating the leg into proper position from the elbow; and it was a problem how to effect it by any means. The mare was removed from the stable and placed on a steep incline, to raise the hind quarters. But it produced no change in the position of the fœtus.

The palm of the hand was then placed over the foot and the foot gently pushed in a forward direction. Several times it slipped from the palm, and returned to its former position. However, after several attempts it went the whole journey, and the leg became bent at the knee. On again manipulating at the bend or turn in the uterus, it was found that by pulling it back a little, the leg could be grasped round the pastern, and there was little difficulty in pulling it forward sufficiently to get the knee past the bend, or in straightening it out into the proper position in the vagina.

When this had been accomplished it was found that the head, by the same means, could be grasped by the lower jaw, and also brought round the bend into the vagina. Foaling was then completed with ease. The foal, however, was dead.

The mare was cleansed, the uterus washed out with corrosive sublimate solution, and two pessaries introduced into it.

It was then foundthat the pocket had disappeared, and the uterus resumed its normal shape. The mare made an uninterrupted recovery

So far as one can judge, the malformation would appear to have been caused in the following manner:—The foot of the foal would have got caught in a slight fold in the uterine wall, and become fixed there. With each contraction of the uterus, the fold became deeper owing to the pressure of the foot, and the foot got into a longer pocket, until the pocket became coextensive with the length of the leg, and the foot reached a position just inside the vulva. The head had followed this leg.

A LAME HORSE.

By J. H. PARKER, M.R.C.V.S.

(*Faringdon.*)

On Boxing-day last was called 10 miles to see a 5 years old Shire gelding, which a farmer had lent a neighbour to pull up some threshing tackle from near the river Thames. The horse slipped up coming through a gap in the hedge. I found him down, but he could get up and stand on off hind, but unable to bear any weight on the near hind leg, and in great pain when standing. He used the sound leg as a pivot and whirled round like a dancing dervish. It required an acrobatic performance to keep out of his way and he would go down with a flop. He seemed easier when down. Three curved ladders were bound together and the horse roped firmly to them and he was gently pulled home, about 3 miles, by a team of 4 horses. We put him in slings and he immediately began to sweat and was evidently in agony, so we let him down again. His owner wanted to have him killed, but I said "We can do that when we can't do anything else, let him lie on a soft bed for a couple of days, and play the Asquithian policy." I saw him in two days, when he was much improved and standing fairly comfortably on the lame leg, which was considerably swollen at the true hock joint, the swelling being soft and feeling like a huge bog spavin. He made an uninterrupted recovery at the end of January and was put to work again. I saw him last week and there is no trace of any swelling or injury to the hock. I understood, as a student, that the capsular ligaments were not liable to sprain, but if this was not a sprain then I don't know what it was.

CASE OF STAGGERS IN HORSE.

By M. Clarkson, M.R.C.V.S.
(*Satrow, Richmond, Yorks*).

On April 22nd of this year I was asked to go and see a horse belonging to a farmer which he reported to be seriously ill. I found the horse, a valuable Clydesdale 4-year old, in a semi-comatose condition, standing well forward in the stall and resting his head over the side of the stall. It was with difficulty we could get him either to back or turn round. I found the pulse to be full and slow, breathing and temperature normal, and the bowels acting regularly. I diagnosed the case as one of stomach staggers, although it was difficult to find a cause, unless it was due to the little quantity of fresh spring grass, coming up rich and green below the trough where he was watered twice a day. Perhaps he would be allowed to stay out 15 or 20 minutes each time, and would graze this. A dose of physic consisting of 1½ pints of linseed oil and 2 drams of calomel was given him, with difficulty. Next day, I went to see him, and found he had broken loose in his stall, turned round and was pressing against the stone cheek of the doorway so heavily that it was considerably out of the plumb and in great danger of letting the house end down. We got him back in the stable in a short time, so that we could open the door, and got him outside. He staggered about, with very little control over his movements. It now became a question whether he should be left in some building and chance him falling and damaging himself or someone, or turning him out, although the weather was cold, and letting him take his chance that way. As the farmer had no suitable loose box, I decided on the latter, and as the oil had not operated, I decided to give him a 6-dram physic ball. He would take just a little mash, and eat a few bites of hay. Next day, I found he had staggered over a wall, out of the field he was placed in, and the farmer had found him across the river 200 yards away, having dropped over an embankment ten or twelve feet high. With great difficulty he was got back, as he crossed and recrossed the river five or six times before he could finally be got out of it (where the embankment was low), being unconscious as to where he was or what he was doing. We then drove a stake into the ground, tied a long rope to it, tethered him, and rugged him up well with woollen rug covered with oilskin cart cover. For medicine he had Pulv. nux. vom., ½ dram; Gent., 2 drams; Fenygrec, 2 drams; Sod. bicarb, ½ oz. Misce. for one powder, mix with treacle to a paste and smear on tongue. One to be given twice a day, Next day, no improvement; coma getting more profound. Wandered continually round the circle permitted by the rope (with his head hanging down), too unconscious to take food, Next day I tried to drench him with milk and eggs, but he was too dazed to swallow. I now commenced enemas of milk and eggs—three times a day. These were continued 5 or 6 days, and were the only nourishment he had He would not eat or drink anything. At the end of that period a little improvement took place. He would look up when anyone approached him. He began to drink a few mouthfuls of gruel and eat a few bites of hay. We now put him in an outhouse at night, as the weather was cold. For two or three days he continued to drink and eat a very little in a half dazed condition.

About the twelfth day from the commencement, when the owner went in the morning to see him, he whinnied as he approached the door, and on opening it he was surprised to find that the dazed condition had quite passed away, the horse being quite conscious and ravenous for food. He was carefully dieted for a few days and made an uneventful recovery. He had got very low in condition during his illness, but soon regained flesh.

I think this case may be of interest on account of the coma passing off so suddenly and completely as it did. The cause of the illness was also obscure unless it had been the fresh spring grass referred to, and there appeared to be nothing else to account for it.

RETENTION OF URINE AS A CAUSE OF COLIC IN YOUNG FOALS.

By P. WILSON, M.R.C.V.S.
(*Lanark.*)

In my experience it is fairly common to have colic in foals from eight to twenty-four hours after birth, in which the bowels have been acting quite regularly, and the appetite has been normal, but where they have been carefully watched, the passing of urine has not been noticed.

At first the foal appears to be getting rather dull, it then begins to kick a little and walk round the box more than usual, stretches itself as though about to urinate, but does not.

After some time, it lies down, but not for long, rises again and assumes the position for micturition, without any result. It may suck a little milk, then wander round a little and lie down, but does not seem to be comfortable, and does not fall asleep.

When this has been repeated several times, symptoms of more acute pain develop, and there is persistent rolling on to the back or over the body from one side to the other, with some groaning. Every now and again there is an endeavour to micturate, which is ineffectual, until the pain becomes so extreme that constant groaning and rolling is evidenced. Occasionally at this time the foal will rise, and when up, it goes round the box at a smart pace, almost a trot, and frequently also kicks out with the hind legs.

In cases of some standing the belly looks fuller than it should be, and in extreme cases palpitation reveals the presence of liquid in the abdomen. The temperature is normal, but the pulse is very frequent and full, even hard, and the breathing is blowing in character.

It is most frequently seen in colt foals, I have only seen one case in a filly foal.

To me it appears that it might be due to either of two causes, viz. :—

(1) A weakness of the bladder wall, which makes it incapable of expelling the contents.

(2) A gluing together of the walls of the urethra with mucus, which the contraction of the bladder is unable to overcome.

The case I had in the filly foal was undoubtedly due to weakness of the bladder, which disappeared in a few days, and gave no further trouble.

Treatment.—Small doses of spt. of Ether nit. are quite frequently given by the owner, before seeking advice, and quite often with happy results. The owner thinks it is due to the medicine stimulating the excretion of urine, which, according to his idea, is in abeyance. But, in my opinion, the extra quantity of urine excreted produces sufficient pressure in the bladder to overcome the obstruction in slight cases, and recovery follows. In cases where it fails the extra pressure produced only aggravates the case.

The quickest way to give relief is catheterisation. In filly foals this is not difficult to accomplish and in the case I had it was done thrice daily for three days before micturition was normally performed.

For colt foals I don't know that a cathether is manufactured, at least I ordered a foal's catheter several years ago and the one I got would do for a colt nine months old or so, but is hopeless for a new-born foal. However, the whalebone stillet sent with it appeared to be about the proper thickness, and quite flexible, and a trial was made to introduce it into the bladder. It proved to be easy to accomplish, and in every case in which it has been used micturition took place shortly afterwards, with immediate and permanent relief from the pain, no further treatment being required. Perhaps some instrument maker may take the hint and produce a proper instrument.

General Articles.

THE NECESSITY FOR ABATTOIRS.*

By THOMAS PARKER, F.R.V.C.S.
Newcastle-on-Tyne.

(*a*) MEAT INSPECTION.

In order that the inspection of carcases may be properly carried out, all slaughtering should be confined to one place, *i.e.*, centralised, and be permitted only during stated hours. In private establishments the slaughtering of animals takes place at all hours, and when it is remembered that within this city there are 106 separate slaughter-houses, it will be obvious that proper supervision is impossible, for, whilst inspectors are at work in one locality, animals are being slaughtered and the carcases removed from premises situated in others. The tramping of inspectors from one establishment to another examining a carcase here and there, although doing their best under the circumstances, does not constitute efficient inspection. Such a method leaves innumerable loopholes for the removal—through ignorance or otherwise—or even the concealment of diseased parts and organs. It is true that so far as this city is concerned there are slaughtermen who, whenever they detect an abnormality, promptly report the matter, so that arrangements may be made for the necessary inspection of the carcase concerned. It must be admitted, however, that to rely on the practice of having diseased or abnormal carcases detected by slaughtermen (whose knowledge is insufficient), and afterwards reported to the Authority by themselves or their employers, is not only placing a serious responsibility upon the wrong shoulders, but also exposing the consumer to grave risks.

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* From a "Report on the Provision of Public Abattoirs for the City and Abattoirs and Market Scheme."

And in support of the latter statement, one has to point out that, on several occasions, diseased organs and carcases have been found on premises within the city mixed up with healthy ones, and which were of such a nature—although dangerous to the consumer—that it would be absurd to expect laymen, including butchers and slaughtermen, to detect them. It is readily admitted that, under the present system, it is impossible to inspect more than a comparatively small percentage of the carcases of animals slaughtered within the city. And when one considers the fact that, during the past ten years, between two and three thousand carcases have been condemned as totally unfit for human consumption, of which more than a thousand were condemned for tuberculosis alone, no great stretch of imagination will be necessary to enable one to grasp the gravity of the subject. Finally, in order to demonstrate the facts that under the present slaughter-house system, whilst persons are exposed to the risk of infection, not only by eating but also by handling diseased meat, there remains the further risk of the spread of disease amongst animals, perhaps the following different types of cases, which have come within the experience of the Veterinary Inspector within the city, will suffice :—

1.—On entering a slaughter-house, two slaughtermen were found completing the dressing of a prime bullock. On examination it was found that the animal had been bled when at the point of death, suffering from anthrax. Both slaughtermen were literally covered with blood and, owing to the nature of the work, not only the floor but also the walls, utensils, etc., were in similar condition. When it is stated that, in such a case, a few drops of blood may contain millions of Anthrax Bacilli, and that disease may be contracted by inoculation through the merest scratch on the skin, the danger will be apparent. On the same premises healthy carcases were found. In this case it was necessary to promptly deal with not only the slaughtermen, including their clothing, but others who had previously handled the dying animal, besides animals having been in contact, carts, lairs, railway waggons, the slaughter-house concerned, and every conceivable thing likely to have been contaminated directly or indirectly, in order to avert disaster. Fortunately, the methods adopted to cope with the situation proved successful.

2.—On entering a butcher's shop, one and a half quarters of beef were found hanging close to the wall near other quarters. Being turned in the opposite direction usually found in shops, they aroused suspicion. On examination, it was found that they had been neatly dressed and certain parts removed, with the idea of concealing evidence of disease. Other diseased quarters, parts of which had already been disposed of, were found on a bench within the same shop. A search was then made. In a cellar beneath, two butchers were found busily engaged cutting meat into small pieces on a table. These pieces were also from the diseased quarters. At one end of the table was a mincing machine, through which part of the diseased pieces had already passed. Behind the table was a cupboard, which, on being searched, was found to contain diseased organs, besides huge masses of tuberculous growths, which had been stripped from the same carcase. The carcase in question was that of a cow, which had been slaughtered in a private slaughter-house and removed during the night. The whole lot was seized, taken before a magistrate, and afterwards destroyed. At the police court, the owner was fined the maximum penalty.

3.—On entering a slaughter-house, the carcase of a prime bullock was found which had just been dressed. The owner passed the following remark: "That's a fine bullock, Mr. Parker, isn't it?" I replied, "Yes, if he's as good as he looks he is a real good one." On turning round, the lungs and other offal were observed suspended by crooks close to the wall. On manipulation, the lungs were found to contain tuberculous growths. In the meantime, the owner and the slaughterman continued to emphasise as to the fine quality of the carcase. Outwardly, the carcase presented no visible abnormality, excepting over a small area (about 2″ × 2″) in front of the shoulder from which—according to the slaughterman—the skin had been difficult to sever. On examining the carcase, it was found to be a highly dangerous case of tuberculosis, for, on cutting into several of the more important deep-seated glands, each gave vent to large quantities of tuberculous matter (pus). After completing the examination the whole lot was condemned, to the surprise of the owner and slaughterman alike. Apparently, the abnormal condition beneath the skin in front of the shoulder had not aroused their suspicion.

4.—A slaughter-house was visited in which were a number of carcases of pork recently dressed. One of these presented evidence that the animal had been suffering from swine fever, and on examination of the internal organs lesions of the disease were detected. The carcase and organs were accordingly condemned and destroyed. It was found that the animal had been sent to the slaughter-house from a farm within the city. On visiting the farm premises, a large number of swine were found affected with the disease. In this case, we have an illustration of how meat inspection may be the means of not only prohibiting the sale of unfit food, but also of assisting in the control and prevention of the further spread of disease amongst farm animals.

TUBERCULOSIS.

Its prevalence.—Tuberculosis is generally recognised as being one of the most widespread of the diseases as affecting food animals. In the various herds of cattle, the percentage of animals found affected varies to some extent, but, as a rule, the percentage of animals affected in dairy herds is considerable, and in some instances very high, as the following example will illustrate.

Some months ago, a proprietor of a dairy farm decided to give up cow-keeping. There were sixteen cows and one bull. All of these were subjected to the tuberculin test. Of the whole, fifteen cows reacted to the test. Of the fifteen reactors, three were sent to the knacker's and destroyed.

The remaining twelve cows were, by arrangement, sent into the city to be slaughtered, subject to inspection. Although the twelve cows, before slaughter, appeared quite normal, on examining the carcases and organs after slaughter, every one of the twelve was found more or less affected with the disease:

Tuberculous meat and the risk of infection.—Not the least important of the dangers of tuberculous meat is that concerning the handling of it, and may be summed up as follows :—

When joints from extensively diseased carcases are sold by accident, or after having been purposely faked, they may be either contaminated with tuberculous matter which has been spilled over them and imperfectly removed, or they may include a gland or glands exposing or containing tuberculous material. Such meat may contaminate the hands of the housewife, the kitchen table, knives, plates, pantry shelves, or, if left in the pantry, may be overrun by flies passing to and fro between the meat and a loaf of bread, or a basin containing milk, thus contaminating the household, besides food materials ready for use, long before the meat reaches the oven.

Again, by experience, one is aware of the fact that not only healthy, but also tuberculous carcases and organs, whilst hanging in private slaughter-houses, are commonly overrun by large rats. These rodents often cause serious damage to healthy carcases; but when they overrun and eat into tuberculous material and, having got their limbs, etc., well contaminated, pass on either to a healthy carcase within the same or adjoining slaughter-house, or to some other part of the district, the possibilities of spreading disease are by no means negligible.

It is hoped that these few observations will assist in demonstrating the necessity for complete supervision and inspection.

(*b*) INSANITARY CONDITIONS.

Owing to the scattered distribution of private slaughter-houses within the city, it is impossible to prevent the occurrence of nuisances from time to time, for certain of these premises are closely surrounded by private dwellings. In some of these places, while slaughtering is in full swing, there being insufficient accommodation for the live animals awaiting their turn, many are driven out into the alley-ways and allowed to wander about until the slaughtering process of the day is at an end. The animals are then driven into the slaughter-house and allowed to crowd together, urinating and defæcating within the small area. Ammonia and other gases and steam are liberated freely, and all this takes place—in many instances—immediately beneath the raw food material (carcases) hanging within the same building. It is not uncommon-to find butchers skinning and dressing carcases whilst live sheep and lambs, and sometimes calves, are crowding around them, simply because the animals have no other place to rest in the meantime. Such premises are—owing to the unavoidable over-crowding—invariably found in a filthy condition. The butcher, unfortunately, is working against difficulties during the process. Large quantities of blood are often wasted and much allowed to find its way into the sewers. Moreover, large quantities of blood and filth are not only trampled about the premises, but find their way on to the public thoroughfares. Furthermore, private slaughter-houses are commonly frequented by school-children—a most undesirable proceeding.

Another objectionable practice connected with many private slaughter-houses is that concerning gut-scraping, *e.g.*, when sheep intestines are allowed to steep in water too long and are then scraped; the liquid filth is emptied down the sewers and, particularly during summer months, the odours arising therefrom, even from those a considerable distance from the premises, are most repulsive. Skins scraped under these conditions are often rubbed up with coarse dry salt, and, although semi-putrid, are used for sausage-making.

Food prepared under such conditions, although masked by the methods adopted, is quite opposed to good sanitation. The great majority of the slaughter-houses within the city are such that, owing to structural defects and arrangement, proper cleansing is impossible, and consequently they are absolutely unfitted for the purposes required.

Finally, there are other objections owing to the premises being situate in different parts of the city, namely :—

1.—The driving of animals weekly through the busy thoroughfares and residential districts to reach the slaughter-houses.

2.—The carting of refuse filth, hides, stomachs, etc., from these various premises through the streets.

3.—The storage of filth in refuse carts whilst awaiting removal.

4.—The undesirability of any of these practices, or the presence of such insanitary premises in densely populated districts.

5.—The accession of such nuisances, particularly during the summer months.

(*c*) HOUSING OF ANIMALS, HUMANE SLAUGHTERING, AND THE PREVENTION OF CRUELTY.

Animals intended for slaughter for human food, on leaving farms or feeding centres, are invariably subjected to considerable journeys by road or rail, either before or after passing through marts or markets on their way to slaughter-houses. Whether fatigued or otherwise, the least that can be demanded on their behalf is that they shall be provided with comfortable quarters in which they may be rested, watered, and, if necessary, fed during the time elapsing between their arrival and the moment they are to be slaughtered. It is but fair to state that, in a great many private slaughter-houses, such conditions do not obtain.

A reform badly in need of being carried into effect is that appertaining to the whole process of slaughtering, up to and including the moment of actual killing. At the outset, one may state that that method which will secure the minimum amount of rough handling, immediately prior to and the cause of instantaneous unconsciousness at the commencement of the actual operation of killing, should hold precedence over all others.

Anyone who has had actual experience of the methods of procedure adopted in the great majority of private slaughter-houses, cannot but freely admit that a certain amount of suffering, which in some instances amounts to actual cruelty, takes place from time to time.

Notwithstanding these facts, however, it must not be assumed that butchers are cruel, or that it is their set desire to employ methods of slaughter that are other than humane ; but, nevertheless, there is a considerable amount of ignorance, and sometimes carelessness, displayed from time to time, amongst those engaged in slaughtering.

There are many who will argue that a good man will despatch his cattle always with the first blow, but no consideration is taken of the animals that have to serve as the novice's practising block. The prohibition of the slaughtering of animals for food purposes, except in abattoirs in which the use of modern killing instruments is compulsory, is believed to be the only remedy by means of which undesirable methods may be totally excluded.

(*d*) HOME AND FOREIGN MEAT SUPPLIES.

An argument commonly advanced whenever the subject of abattoirs is discussed, and one which will not stand critical examination, is :—" That, as the sale of foreign meat is rapidly increasing in this country, the time is fast approaching when little or no home-killed meat will be required, and therefore slaughter-houses will be of no use."

Foreign Meat Imports.—It is true that the total imports of beef, mutton, pork, hams, bacon, etc., have increased from 10,610,394 cwt. in the year 1894, up to 23,081,895 cwt. in the year 1914. Notwithstanding this huge increase in the imports of dead meat into the United Kingdom during the past 20 years, it should be borne in mind that the rate of increase was greater during the first eight years than during the period since. And when it is remembered that the population of the United Kingdom has been increasing regularly for very many years at the rate of 400,000, or two-fifths of a million annually, it will be admitted that it is essential that better facilities should be offered by the erection of cold storage plant—within the city—not only to encourage overseas trade with our Dominions, but also to develop our port as a great distributing centre, besides enabling the wholesale frozen and chilled meat traders within this and outside districts to meet the ever-increasing demand.

Home-killed meat.—About 23 years ago, some half-a-million each of live cattle and sheep were imported annually into the United Kingdom. These imports have been gradually reduced, until the year 1914, when they ceased altogether. Nevertheless, it will be readily understood that the slaughtering of food animals has gradually increased during the past 30 years or so, when it is stated that the total meat supplies obtained from animals bred and fed within this country have gradually increased during the same period, *e.g.*—

The number of cattle within the United Kingdom has increased from 10,423,284 in the year 1884 up to 12,451,540 in the year 1916. In fact, for England and Wales alone, the total number of cattle returned in 1916 by the Board of Agriculture was the largest on record. Again, according to the recent statement by the President of the Board of Agriculture in reference to the Free Importation of Canadian Cattle, one is justified in anticipating that, so soon as circumstances permit, the number of fat and store cattle available for sale and slaughter at our markets and abbatoirs, respectively, will be further increased. Although the numbers of sheep within the United Kingdom have fluctuated from time to time, they have quite recently shown signs of a great revival, for they have increased from 27,629,206 in the year 1913 to 28,849,655 in the year 1916. In England and Wales alone there were 428,546 more sheep in 1916 than in the year previous. And when it is remembered that Northumberland—in which there were 1,124,880 sheep in 1916, or an increase of about 25,000 over the year previous—is the largest sheep-breeding county in Great Britain, it may be fairly stated that this city is admirably situated for the supply of sheep, not only for abattoirs, but also for its live stock markets.

Pigs have, during recent years, shown a slight decrease, due, no doubt, to the difficulties experienced in breeding and feeding operations and movement on account of the prevalence of and mortality caused by swine fever. Other factors operating to the disadvantage of the industry may be said to include the rise in the cost of feeding, and the number of small holders giving up for military reasons. Notwithstanding these remarks, however, great hopes are entertained for the future, for, thanks to researches in the United States of America, and by the Veterinary Department of the Board of Agriculture in this country on the serum treatment, the ravages of swine fever promise to be so dealt with that the industry may prosper. The following table will suffice as an illustration in this direction :—

RETURN OF OUTBREAKS OF SWINE FEVER FOR WEEK ENDING MAY 26TH, 1917. GREAT BRITAIN.

PERIOD.		SWINE FEVER.	
		Outbreaks Confirmed.	Swine Slaughtered as Diseased or exposed to Infection.
Week ended May 26th, 1917		75	27
Corresponding week in	1916 ..	123	356
	1915 ..	122	720
	1914 ..	117	954
Total for 21 weeks 1917		1,128	471
Corresponding period in	1916 ..	2,047	6,426
	1915 ..	1,719	7,667
	1914 ..	1,643	16,594

From the foregoing passages it will be gleaned that the future increases in the importation of frozen and chilled meat are never likely to interfere with the necessity for abattoirs and live stock markets. In fact, the future points to the urgency for the continued increase in both directions.

Again, when it is taken into account that, as already pointed out, not only is there a greater weight of meat produced annually from our home-bred herds, but a greater number of cattle bred each successive year within this country, the growing necessity for abattoirs and markets generally will be obvious. use.

Finally, when one also recalls the facts that within the city there are 23 slaughter-houses fewer to-day than 9 years ago, and that during last year (1916) no fewer than 25,365 cattle, 1,388 calves, 113,087 sheep, and 21,508 swine were slaughtered, the largest on record, it should be clearly evident that to-day there is, *not only within the country generally,* but within this city in particular, irrespective of future developments, a greater need for modern abattoirs than at any previous time.

(*e*) THE MEAT INDUSTRY, AGRICULTURE, AND CONTAGIOUS ANIMAL DISEASES.

Where slaughtering is centralised, animals may be subjected to constant supervision and inspection prior to and at the time of slaughter, with the result that, in the event of the existence of some contagious malady, not only would the carcase, etc., of the animal be dealt with on the spot, but the detection of the condition would be the means of instituting inquiries into the source of the outbreak, so that steps could be promptly taken for the control and prevention of further spread of the disease concerned, to the immeasurable benefit of agriculture and the public generally.

In the absence of such supervision, an animal may be slaughtered whilst ill or at the point of death, and suffering from some highly dangerous condition, as, for example, anthrax. Irrespective of the dangers of such meat as an article of diet, persons handling it are exposed to grave risks of becoming infected by inoculation. But the risk of spreading the disease does not end here, for we have to take into account the disposal of blood (which may be carried to farms as manure), offal (which may be used for pig feeding or otherwise), hides, etc., besides the contamination of other meat on the premises. In properly arranged abattoirs, not only is there an equipped laboratory in which to examine, microscopically or otherwise, blood or other tissues in connection with diagnosis, but isolated buildings, such as a byre for suspects, post-mortem room and destructor, are also provided in which to deal finally with the carcase and organs of any such animal. Under the present slaughter system, such preventive measures are impracticable. Again, there will be vividly within the recollection of butchers and others the enormous dislocation of certain traffic and the cattle trade within the district during 1914, and particularly 1912, on account of the existence of foot and mouth disease. Butchers were compelled to go out into the country districts to purchase their stock, slaughter them on the farms under most unfavourable conditions, and then cart the imperfectly set carcases to their shops at a financial loss directly to themselves, and indirectly to the community in general.

During a certain period immediately following each outbreak, the district concerned is generally mapped out into zones, extending from the centre of infection to a radius of several miles, for the purpose of restrictions regarding the isolation or movement of animals for slaughter or otherwise. In view of the possibility or, more correctly, the probability of our being visited periodically by outbreaks of foot and mouth disease, the establishment of abattoirs within the city would prove a boon—in such an event—to agriculturists and to meat traders in particular, for it would then be possible, in many cases, for animals to be moved by licence from the district concerned direct to the abattoir for immediate slaughter, rather than have to be held up indefinitely, to the disadvantage of meat traders and agriculturists alike.

(*f*) MEAT TRADERS' OBJECTIONS.

There are some butchers who, no doubt, would view with alarm and strongly oppose their being placed under proper supervision, besides giving up the privilege of using private premises in which to slaughter animals at any time during the day or night. As the majority of the butchers within the city slaughter cattle insurable against disease, *i.e.*, bullocks and heifers instead of cows, such an objection need not arise.

The stealing of offal, or the exchanging of carcases by unscrupulous employees, is another objection commonly raised by meat traders. In properly designed abattoirs, on completion of the process of dressing, each carcase may be run by over-head rails directly across the hall into cooling spaces opposite, each of which is separated by iron bars (about 2″ apart), and in which, not only the carcases, but also the offal, may be secured by lock and key until removed by the owner. These spaces are let to individual master butchers and, although under proper security, the carcases are always under the surveillance of the authority concerned. In any case, the supervision and control of persons slaughtering or removing carcases is more possible in regulated abattoirs than under any other conditions.

The extent of the inconveniences caused by having to cart carcases from central abattoirs will depend upon the situation of the sale shops within the district concerned. It naturally follows that, in this direction, some traders would be much more favourably situated than others. There are many traders who come from outside districts, and purchase freshly killed carcases from wholesale firms within the city without any apparent objection. Again, there are others who have their private slaughter-houses long distances from their sale shops, but of such inconveniences one never hears a word. So long as sale shops are situate in various parts of cities and towns, which will probably always be the case, so long will certain traders have to cart their meat some distance, far or near. To endeavour to obviate this difficulty in regard to many of the traders is an impossibility, and whenever local authorities allow themselves to be unduly hampered by the question, failure to meet the requirements of the majority and the public generally will be almost certain.

Another argument sometimes advanced by meat traders is " that to slaughter within abattoirs would be so costly that the price of meat would have to be raised." Fortunately for the public, such a statement has neither foundation in fact nor any particular bearing on the subject, *e.g.*—Within the city the private slaughter-houses are let at a weekly rental of from 8s. to 12s. 6d., exclusive of lighting, and the occupiers, in most cases, provide their own implements.

A business disposing of 3 cattle, 15 sheep, 1 calf, and 2 pigs weekly may be considered a good-class family business, and almost above the average. The cost for using the abattoir in which to slaughter these animals would be 10s. 1½d. In private slaughter-houses, the occupier has to cleanse and limewash the premises regularly, provide lighting, besides the upkeep of implements, etc. In an abattoir the user has neither upkeep nor light to provide, but has all the advantages of clean, wholesome and roomy premises in which to rest and slaughter his stock, and proper chambers in which his carcases may be stored whilst setting, so that he may be enabled to present them for sale under the most favourable conditions possible, from the point of view of market value.

Translations.

FRUIT AND VEGETABLES AND THEIR RELATION TO THE SPREAD OF INFECTIOUS DISEASES.

By V. K. Russ.

The more frequent occurrence of certain infectious diseases at distinct times of the year coincident with the use of these foods has been noticed. Dysentery is a summer disease, typhus is most frequent in the months of September and October and in the first half of November. On this account it has been considered that there is a possibility of a connection between the frequency of the diseases and the use of fruit and vegetables at these periods. The possibilities of infection of these foods, by bacilli carriers, secretions and excretions, and intermediate carriers are numerous enough (liquid manure, transport receptacles, street dust, handling). It is on this account of interest to know how long pathogenic bacteria (typhus, paratyphus, bacilli, dysentery, cholera) can remain alive on fruit and vegetables. The tests were carried out partly with pure cultures, partly—corresponding to,the natural previous conditions—with human fœces containing the bacilli concerned. On apples, lemons, apricots and plums, the bacteria from pure cultures remained alive from 9 to 30 days and no marked differences were noticed in this respect in the different kinds of fruits. The paratyphus bacilli persisted the longest, then cholera vibriones, dysentery and the shortest typhus bacilli.

On strawberries and raspberries cholera, typhus, paratyphus, and diphtheria bacteria persisted a much shorter time, only up to 6 days.

Experiments with fœces gave similar results. The germs remained alive 4 to 18 days on fruit, the paratyphus bacilli persisting the longest, and the cholera vibriones showing the least life activity. On apples the typhus bacilli were present longer than on oranges and plums. Also the paratyphus bacilli remained alive on apples and pears longer than on plums and lemons.

In cold and darkness the germs lived longer than in light and summer temperature. Generally it appeared as if the bacteria remained alive a slightly shorter period in case of infection with fœces than with pure cultures. It appeared as if the saphrophytic bacteria in the fœces had an injurious effect on the pathogenic bacteria.

On radish and lettuce infected with pure cultures, the bacteria could be demonstrated for 4 to 38 days, in infection with fæces from 6 to 25 days. The transmission of infectious intestinal disease by raw fruit and vegetables is an important one from an epidemiological point of view. To avoid it the author recommends a hygienic declaration of these products. The sprinkling of vegetables with liquid manure shortly before gathering, the handling of wares by buyers, should be condemned. Washing and peeling of fruit lessens germ infection, but does not entirely remove it. Cholera vibriones on lettuce could be broken down by bathing it in vinegar three quarters of an hour before use. The consumption of fruit and vegetables from typhus infected regions is to be forbidden. To kill pathogenic bacteria on raw fruit the author recommends that it be dipped in boiling water for ½ to 1 minute before using. Taste and appearance do not suffer by this. Direct experiments on the efficacy of these procedures are in course of employment.—*Swiss Veterinary Journal.*—G. M.

ACORNS AND CHESTNUTS AS ANIMAL FOODS.

Horse-chestnuts are good for sheep; bovines eat them and they may be fed to horses; pigs refuse them and they are poisonous to poultry, ducks, and geese. Sheep will take 1 kilo. per day, cattle 2—3 kilos, preferably cooked, or the fresh or dried chestnuts may be mashed and mixed with the food. All animals can eat acorns, but it is advised not to exceed the following quantities .—

	Fresh Acorns.	Dried.
Horse of 1050 lbs. weight ..	About 8 lbs.	About 5lbs.
Cattle (fattening) 1260 to 1470lbs.	,, 12½lbs.	,, 6½lbs.
Milk cow 1050-1260lbs. ..	,, 8lbs.	,, 5lbs.
Hogs	2 to 2¼lbs.	1½ to 2lbs.

Four quarts of acorns are equivalent to 2 quarts of oats. The feed may be continued for a month and then dropped for a week and re-continued. Horses and cattle are fed the acorns raw, broken and freed from shells. For days the acorns are broken and coarsely ground and mixed with boiled potatoes, or, better, boiled with them.

Recueil de Med. Vet.

Abstracts.

SEAWEED AS FOOD FOR HORSES.

From a report by Mons. Adrian, of the French Ministry of War :—

The analysis of seaweed as compared with oats as shown by Mons. Balland is as follows ,—

	Seaweed. Per cent.	*Oats.* Per cent.
Water	14.40	12.55
Hydrocarbons	52.90	68.80
Nitrogen	17.30	9.10
Cellulose	11.50	8.45
Mineral matter	3.90	3.10

It will be seen that the seaweed from which the salt has been extracted contains less hydrocarbonated matter but a much higher percentage of nitrogen, making it a very nutritious product if digestible and assimilated.

In June 1917 some horses belonging to M. Verdier-Dufour, of Aubervilliers, were in a bad state from lymphangitis. There were 6 horses. Three had ordinary diet of oats, hay and straw and three were fed on alimentary seaweed. They were kept at work. For the first eight days alimentary seaweeds were substituted for oats at a rate of 0.35 kilo for 0.45 of oats. During the rest of the experiment, which lasted 24 days, seaweed was substituted entirely for oats. On the 24th day the horses fed on seaweed were found to have increased 6 per cent. in weight and their general condition had improved and the lymphangitis had disappeared. In the other 3 animals fed on ordinary diet the lymphangitis did not improve. The animals had accepted, digested, and assimilated the new food in place of oats.

Experiments were made on 20 horses of the First Cuirassiers, which were divided into 2 lots and one lot placed on normal diet, and the other given one kilo. of alimentary seaweed in place of the kilo. of oats. The experiments were under the supervision of Mons. Jacoulet and Mons. Fray; they lasted two months, and it was found that on weighing the horses those fed on seaweed had gained individually 13 kilos. in 2 months whilst the others had scarcely gained 2 kilos.

Seaweed grows abundantly on the coast of Brittany. It is considered that 0.75 kilo. of alimentary seaweed is equal to 1 kilo. of oats but this point requires further elucidation. As a substitute for oats there should be a great future before seaweed. France imports 2,000,000 quintals of oats yearly, representing a sum of 35,000,000 francs. If the sea can supply a supplementary crop to the home fields, much money sent out of the country for oats will remain at home.

ANTHRAX AND ITS PREVENTION.*

ANTHRAX is an acute, infective disease of man and animals and is caused by the anthrax bacillus, which becomes disseminated throughout the body so that every part is infectious. The many animal products used in commerce may thus be a grave source of danger if they emanate from animals which have succumbed to the disease. Although in this country anthrax is not to be regarded as a frequent cause of death, it is nevertheless of great importance on account of the increase which has taken place, and especially in virtue of the very large amount of material imported from countries where anthrax is rife. In order to prevent the disease in dangerous trades working with possibly infected animal material it would, at first sight, appear to be a simple thing to disinfect the infected material. In practice, however, this is found to be exceedingly difficult on account of the truly enormous powers of resistance of the spore of the anthrax bacillus, which is among the most remarkable of living things. A method to be efficient and practicable (1) must aim at the complete destruction of the infectivity of the material; (2) must not damage the material;

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* Report of the Departmental Committee Appointed to Inquire as to the Precautions for Preventing Danger of Infection by Anthrax in the Manipulation of Wool, Goat Hair, and Camel Hair. Vol. I., Report of the Disinfection Sub-Committee. (London: Published by His Majesty's Stationery Office, 1918.) Price 1*s.* net.

(3) must be practicable on a large commercial scale; and (4) its cost must be reasonable.

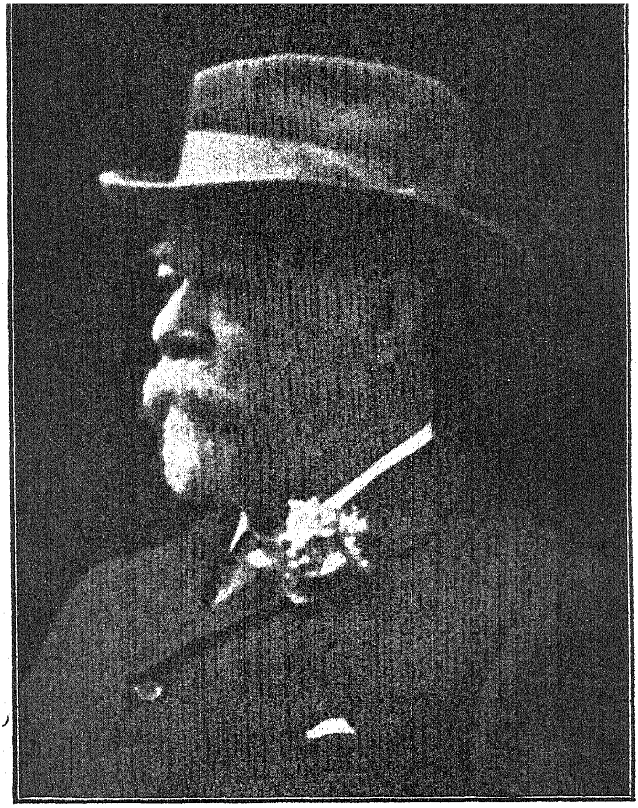
Hitherto all methods have failed in one or other of these essentials. The report before us, however, contains a large body of accurate experimental evidence which goes to show that complete success can now be attained without risk to the workers and without damage to the material disinfected. The main feature of the process is a preliminary treatment in which material is submitted to the action of a warm solution of soap and water containing alkali, followed by squeezing through rollers. This causes softening and disintegration of any infected blood-clots, and the spores are laid bare for the subsequent destroying process, which is carried out by a warm solution of formic aldehyde. The material, after being again squeezed through rollers, is then dried and kept for a short time as an extra safeguard. According to the testimony of practical people the hair and wool are not injured by the process, and it is computed that ten million pounds of infected wool can be effectively disinfected for something less than 0·824 penny per pound weight.

The report is a brilliant instance of how preventive measures in medicine must be based on scientific inquiries, and it is not too much to expect that "wool-sorter's disease" may soon disappear from the list of the fatal maladies of man.—*Nature.*

Obituary.

MR. F. H. GIBBINGS, F.R.C.V.S.

THE death of Mr. Frank Henson Gibbings, of the Black Boy Hotel, took place at the hotel on Saturday last. Mr. Gibbings, who was in his 64th year, had been ill for about twelve months. A native of Devonshire, and originally in practice as a veterinary surgeon at Bideford, he came to Nottingham some thirty years ago as partner with the late Mr. Greswell, whose practice was at that time on Park-row. Some years later he joined the late Mr. Turner in partnership at the Black Boy Hotel in succession to the late Mr. Mitchell, and thenceforward resided at the hotel. He took his diploma in London in 1878. He was a Fellow of the Royal College of Veterinary Surgeons and carried on a large and successful practice. He enjoyed the confidence and esteem of a large circle of friends both in his profession and as proprietor of the hotel. He was a Royal Arch Mason and at one time took a keen and active interest in the craft. A member of the Black Boy Birthday Society, he was for many years its treasurer, having also previously passed the Presidential chair, and until his illness made it impossible, he attended the weekly meetings of the Society and took an interest in all that concerned it. The funeral was on Tuesday,



THE LATE F. H. GIBBINGS, F.R.C.V.S.
NOTTINGHAM.

when, prior to the body being removed to Leicester for cremation, there was a service at St. Mary's, conducted by the Rev. Canon Field, Vicar. The chief mourners were Mr. W. P. Gibbings, of Carlisle, and Mr. A. Gibbings, of Southampton (brothers), and Miss Ward. Among others present were Mr. J. W. Danby, Mr. Guy Preston, Mr. H. S. Ryde and Mr. H. B. Hoe; Mr. Arthur Barlow, Mr. Parker Woodward, Mr. Tom Turner, Mr. C. Taylor, Mr. Pinder, etc. Although there was a request that no flowers should be sent, in addition to one from the family there was a beautiful wreath from the Black Boy Birthday Society, one from Brunt's Charity, one from Miss Mills (Lincoln), and one from the staff at the hotel.

DR. CLEMENT STEPHENSON.

DR. CLEMENT STEPHENSON, whose death occurred recently at Sandyford Villa, Newcastle, was well-known throughout the country, says the *Newcastle Daily Journal*, as a veterinary surgeon, and even further afield as a breeder and exhibitor of Aberdeen-Angus cattle. He was associated with veterinary surgery from childhood, and won much distinction in connection therewith. At the close of his school days he joined his father, who also practised in the city, and, having learnt the rudiments of the profession, went to the Royal Veterinary College, where he obtained his diploma. The high opinion which the authorities of the College held concerning him is indicated by the fact that he was offered the post of Demonstrator and Junior Lecturer in Anatomy. He came north, however, and rejoined his father in the Scotch Arms Yard, the business being afterwards transferred to Newgate Street.

Dr. Stephenson was appointed Veterinary Inspector under the Newcastle Corporation in 1869, and soon afterwards secured a similar appointment for Northumberland. There was no more familiar figure in the city cattle market, where he was to be found in the exercise of his duties every Tuesday. He took a very active and prominent part indeed in stamping out rinderpest, contagious pleuro-pneumonia, and foot and mouth disease. Another appointment he held was that of consulting veterinary surgeon to the North-Eastern Railway Company, and in his earlier days he was also veterinary surgeon to the Northumberland Hussars. Several times Dr. Stephenson was called upon to give evidence before Royal Commissions and Parliamentary Committees, notably on the subject of tuberculosis in cattle. He was one of the first Fellows elected under the charter which was obtained for the Royal College of Veterinary Surgeons in 1881.

With the University of Durham the deceased gentleman had a long connection. He took a leading part in establishing the Chair of Comparative Pathology and Bacteriology, and was a member of the Council of the College of Medicine. In June, 1908, the University recognised his services by conferring upon him the honorary degree of Doctor of Science. In 1912 Dr. Stephenson offered the Council of Armstrong College, Newcastle, £5,000 towards the buildings for an agricultural department for advisory work. The gift was gratefully accepted, and the Council decided that Dr. Stephenson's name should be attached in some manner to the new department.

PIONEER CATTLE BREEDER.

He was the pioneer among "black-skin" breeders in the North of England. For many consecutive years his animals were amongst the champion and first prize-winners at all the most important summer shows, and his phenomenal successes did much to establish other herds of Aberdeen-Angus Cattle in Northumberland and Durham.

Careful handling, any amount of fresh air, and good plain food, along with, of course, special attention to purity of blood, soundness of constitution, and breed type were the lines upon which Dr. Stephenson travelled to win his many successes. The result was an excellent stock. Dr. Stephenson virtually retired from showing several years ago, but he sent representatives to the Royal Show in Newcastle in 1908, with highly successful results.

Apart from the summer shows of breeding stock, the Balliol College herd won golden laurels for their enthusiastic owner at the great fat stock shows. Competing against all breeds and all ages, champion honours were secured by members of Dr. Stephenson's herd at the fat stock shows at York in 1881, at Leeds in 1883, at Norwich in 1881, 1883, and 1893, at Birmingham in 1883, 1884, 1885, 1887, 1893, and 1894, and at Smithfield in 1885, 1887, and 1894. In addition to this record, other exhibits from the herd have been six times reserve for the championship.

In 1878, one which he had picked up as a young one gained for him his first prize at Smithfield as a two-year-old heifer. At that time there were only three pedigree herds in England, whereas now they are spread all over the country, and also in Ireland. Dr. Stephenson firmly held the impression that Aberdeen-Angus were the best cattle with which to meet foreign competition, more particularly on the ground that they mature early.

A NEW ORDER IN ITALY REGARDING HORSES, MULES, OR DONKEYS SENT TO THE ABATTOIRS.

THE order respecting butchery of the equine races came out recently in the *Italian Official Gazette.* It forbids the butchery of all horses, asses, mules and pack ponies which are at all fit for breeding or work. The order is the result of the necessity which has arisen to protect reproduction, which has become seriously menaced by the slaughter which is carried out regardless of sex, age or condition, and also by the necessity for saving all animals capable of work. All animals sent to the Abattoir have to be certified by a Veterinary Inspector as useless either for work or for breeding purposes.

CORRECTION.

In our review of "Veterinary Post Mortem Technique," by W. J. Crocker, B.S.A., V.M.D., page 272, July number, we commented on a supposed omission by the author of the dimensions and weight of normal organs in dead animals. We now find that these are fully given in tabular form (small print) in the book. This being so, the volume is all that can be desired. We are sorry for the oversight which occurred through not finding "size and weight" of normal organs in the index. The price of the book is 18s. net.

Reviews.

ANNUAL REPORT ON THE CIVIL VETERINARY DEPARTMENT FOR THE YEAR ENDING 31ST MARCH, 1917.—22pp. 14 tables, 1917. Price 9d. Allahabad. Printed by Superintendent Government Press, (sent by Mr. S. G. M. Hickey, the Superintendent).

This is an interesting report of official and veterinary work in India.

Veterinary hospitals and dispensaries are doing good work, and measures are being gradually advanced for improvement in the breeds of horses and cattle. The Hon. A. W. Pim calls attention in his note to the importance of horse-breeding operations, the war having increased the need for horses and cut off external sources of supply.

Severe outbreaks of contagious disease among horses and cattle and depletion of the staff have caused the year's work to be beset with great difficulties. Three times as many protective inoculations and vaccinations have however been carried out.

Among equine diseases, glanders, surra, tetanus and strangles, came under the control of the C.V.D. in four horse-breeding districts. Surra caused the loss of 118 animals, and 8 cases of strangles out of a total of 599 proved fatal.

Rinderpest was responsible for 7,563 deaths in cattle, the figure being just about double of that recorded in the previous year. Hæmorrhagic septicaemia, foot and mouth disease and anthrax, caused a total of over 4,000 deaths and blackquarter killed 700 subjects.

During the past year the veterinary assistants visited 15,010 villages and treated 28,320 animals for diseases other than those specially reported on. They castrated 312 animals and attended 33,431 cases outside those treated in hospitals and dispensaries—56,619 protective inoculations and vaccinations were carried out. These figures will give some idea of the vast amount of work done. All credit is due to Messrs. S. G. M. Hickey, E. W. Oliver and C. W. Wilson, under whose direction and guidance and by whose exertions a very great proportion of the work has been carried out. G. M.

NOTICES.

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THE
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Sub-Editor:
GLADSTONE MAYALL, M.R.C.V.S.

OCTOBER, 1918.

Editorials.

WHAT'S OVER YONDER?

THIS query is not asked with the purpose of trying to peep into the Hereafter, or of comforting ourselves with the thought that we shall meet our boon companions, the great figures of history, or our friends Don Quixote, riding on his faithful charger, and Robinson Crusoe and man Friday when we awake in the Shadow Land, but it is written with the idea of arousing within us some thoughts of what we ought to strive for and concentrate our energies on in the future. The dawn of a better day seems breaking at last, and during the glorious and strenuous times that this dawn will herald may we be ready, eager and active to make ourselves better workmen, to lift our profession to a higher plane, to take advantage of all opportunities to serve our country ably and well, and to come out of the work of reconstruction after the War in no whit behind any other progressive profession or body of men. The welfare of the veterinary profession is inseparably wrapped up in the progress and development of agriculture, and no stone should be left unturned to support increased animal breeding and good and plentiful home-life on the soil of the land.

In a recent speech by the President of the Board of Agriculture two sentences occurred: "Where the nation's welfare is at stake, to be a farmer is to be a patriotic Englishman" ("Britisher" would perhaps have been better). "I, for one, shall think with gratitude of the men who, in the face of every difficulty, kept the flag flying on the cornfields of England." This is all very good, but let us hope its sentiment will be carried forcibly and directly into the House of Commons and that the politicians will not forget it all when the future fiscal policy of the country comes to be decided. The political bells would ring truer to-day and faith in the politicians increase and develop if even now the Board of Agriculture was raised to the status of a first-class Government department. This ought not to be one of the phases in the question. "What's over Yonder ?" Recent experience should have already effected the alteration. We as a profession ought to do our utmost to keep the claims of agriculture before our own M.P.'s.

We ought, too, to point out to them and persistently worry them to do something to increase the supply of artificial feeding stuffs. If there is one thing more than another that recent times have shown us it is that the welfare of our animals in winter is almost wholly dependent on an adequate supply of artificial feeding stuffs, and the truth is that the supply is chiefly of foreign origin. There must in the future be some thinking and acting done about this problem. It is a lucrative business, and we ought not to be almost entirely out of it. In the "over yonder" of the future research should play its part in establishing a sound home artificial food product industry. No duty is more urgent or more clearly right and just than that of carrying out the settlement of returned soldiers on the land. Shall we have to wait until the big voice comes that will make itself heard, whether we like it or not, before we deal wisely and fully with this question ? Cash must be found to set these men up, and rural life must be made attractive for them. The absorption into agricultural life of rural workers released from munitions will also have to be provided for.

The recovery from shell-shock will probably largely depend on a quiet country life It is not necessary or desirable that such a life should be an unoccupied and unproductive one. For nervous break-down cases—and heaven knows what a number there will be—the carrying out of large schemes of tree growing and planting will furnish ideal means of cure. We think we have now indicated some of the things in the region of "over yonder" which we can help to further and in which we can give understanding aid.

What will concern us directly will be to keep away disease from our own shores, to detect it promptly and to fight against it scientifically when it occurs. There is room in this connection for all our forces to be concentrated on the destruction of animal parasites. We don't want trench-fever to find a permanent home in this country, and we want to keep away all forms of bacillary infection of the intestines. We should be eager to further all scientific enquiries into the origin of disease. Many of our most prevalent animal ailments are very imperfectly understood, and without right understanding how shall we combat them effectively?

The spread of influenza broadcast must be nipped in the bud. Pleuro-pneumonia, rinderpest, foot and mouth disease, rabies, glanders and lymphangites must be excluded from our country or promptly discovered and dealt with.

The demand for all stock will be great. America has reduced hers, France is breeding less, the British Isles are depleting theirs, Holland and Denmark have sacrificed much of theirs, parts of France and the whole of Belgium have been denuded of stock. The call for horses and animal food will be a very pressing one in the "over yonder." It will be well in the future to remember that "these things rest on the knees of the gods," and that it is our duty to take them off the knees of the gods, and do with them as seemeth best in our own interests and those of our country.

G. M.

THE "NOVICES' SLAUGHTERING BLOCK" AND THE HUMANE SLAUGHTERING OF ANIMALS.

We, as Veterinary Surgeons, are (and should be) the first and the last authorities on the humane treatment of animals. That can be taken as a fact from which we will, as a profession, admit of no digression, nor even allow an argument.

After the war there is no doubt that the "Humane Killer" will be more popular than ever it was before, as every Veterinary Surgeon who has become a Veterinary Officer in the British Army cannot but be familiar with its use on the horse and mule. For the ox it is equally good; but it is objected to still by some butchers on the ground that it destroys life too quickly and completely, preference being given to the poll-axe. The latter is equally humane with the pistol if successfully and effectively used at the first blow, but examination of the hides and skulls of cattle at any large abattoir where this method is in vogue will demonstrate quite a large proportion to have two, three, or even four holes in the portion of skin which covered the brain case.

As stated by Mr. Parker, F.R.C.V.S., in a very able paper (published in the September *Veterinary Journal*) on the necessity for a universal Public Abattoir System, "a good man will despatch his cattle always with the first blow, but no consideration is taken of the animals that have to serve as the novice's practising block."

The "novice's practising block" should not be allowed, as there are plenty of mechanical devices upon which young butchers could practise—machines upon which the strength of the blow would be recorded, and others upon which the direction of a straight blow could be taken—and it ought to be a law that no one should be allowed to attempt the killing of animals for food until they have passed an examination before a Board of Experts and obtained a certificate of dexterity.

In the eyes of our Continental Allies we in England have an extraordinarily good reputation for kindness and humanity to animals, and there is no question but that we have some right to it, but in many things even yet we have room for improvement; and so long as *post mortem* evidence, in the shape of more than one hole in the hide of the forehead of a bullock, can be found in any of our Abattoirs, so long should we agitate for the compulsory introduction of a method of killing which will ensure instantaneous and absolute loss of consciousness in every class of animal used for food.

Evidence of capability to hit straight and hit hard should be made a *sine quâ non* before ever a youth or a man is allowed to attempt to kill with either hammer or poll-axe, and every Municipal Authority should have an Examining Board composed of a Veterinary Official, one or two expert butchers, and one or more lay officials, who should have power to grant a certificate of competency to the prospective candidate.

A VETERINARY TRIBUNAL.

THE Local Government Board and the Secretary for Scotland have appointed twelve well-known veterinary surgeons as a Special Veterinary Tribunal. Its duties appear to comprise studying ways and means to meet the urgent need for qualified veterinary officers fit for service overseas and to find substitutes for veterinary surgeons overseas who, although over military age, are still doing duty. It is proposed to substitute younger men now exempted for these men. The Tribunal will have power to grant certificates on occupational grounds for professional service in the national interest, under conditions laid down by the Director-General of National Service in conjunction with the Veterinary Tribunal and any Government Department concerned. It is expected that a list of officers available for release from service overseas will be submitted to the Tribunal from time to time. The functions of an Appeal Tribunal will also be vested in the body. In another part of this issue we publish two communications from Mr. H. C. Monro, Secretary, Local Government Board.

PUBLISHER'S NOTICE.

Owing to the enormous increase in the cost of printing and paper, we find it necessary, from now onwards, to raise the price of "The Veterinary Journal" from one shilling to one shilling and sixpence per copy. The annual subscription will now become 18s. instead of 12s., and the annual combined subscription, with "The Veterinary News," will be 30s., post free. No increased charge will be made for subscriptions *already* paid to the end of the present year.

Original Communications.

THE VETERINARY SURGEON AS AN EDUCATIVE FORCE.

By G. MAYALL, M.R.C.V.S.

THE full benefit from instruction can only be derived by the individual when he is in a position and state to see why certain desired things are good and beneficial from a hygienic or health point of view. In the case of animal welfare, the human soil in which the veterinary surgeon has to sow seeds of betterment is often stony or sterile. Real education among the rank and file is still in a poor way. It will never be much better until all work has more soul and less commercialism in it. The majority of elementary school text-books, assuming that readers have little intelligence and do not appreciate literary form, are bound in ugly and inartistic covers. Few small manuals exist that deal with diverse subjects in a really attractive and authoritative way. More of the spirit of "Alice in Wonderland," "Monte Christo," "Robinson Crusoe," and "Gulliver's Travels" needs to be instilled into elementary educational text books to-day. Huxley and Faraday understood the true art of making text-books and lectures attractive, and probably in their day and generation they did more for the advance of education than any men have done before or since. There is hardly any subject that might be made more attractive in the schools than that of hygiene, and if the elements of it were understood by the ordinary stableman and cowkeeper the lot of the veterinary surgeon would be a pleasanter and more satisfactory one. When a veterinary surgeon reaches 50 years of age he is apt to become contemplative. He may call to mind that he has probably (if he has good luck) only about 20 more times to hear the cuckoo and see the trees beginning to bud and he may also wonder whether, despite the boasted educational progress of mankind, we have really travelled very far along the road that leads to the prevention of contagion, infection, and disease. We are constantly going into stables where dirt, cobwebs and ancient grooming utensils abound, and into many cow-sheds where the elementary rules of hygiene are never practised. because absolutely unknown. In recent years there has been a great improvement in many cow-houses, but more hygienic soul still needs putting into the body of the cow owner and cow attendant.

The importance of the veterinary surgeon as an educative force is not limited to routine practice and the treatment of animal disease. He should take a broader outlook and concern himself with animal welfare and production in all its varied phases and conditions. A good knowledge of pathology is very necessary to the veterinarian, but if there is one thing more than another that its lessons should brand on our memories it is that in very many cases prevention is better than attempted cure. The teachings of pathology, besides painting glad and joyous signs over a number of therapeutic doorways, also point the way to the abandonment of hope from therapeutics for all animals that enter here. If we can check the occurrence of fell diseases by hygienic measures it will pay us a hundred times better and benefit the country and stockowner proportionately, than by bolstering up animals with two feet in the grave. The minor ailments of an animal that will live are worth more to the veterinary surgeon than the serious diseases of a creature beyond cure. The care and increase of the food supply is a field in which we can do good propaganda work. There never will be a time when a correct knowledge of sanitation and disinfection will be more desirable among the laity than in the few years following the declaration of peace. The veterinary surgeon must do his duty as an educative force in this period. The road may be rough and the community tough, but probably some seed will fall on good soil. The attainment of increased practice of the rules of sanitation and hygiene among animals and about their abodes, tracks and surroundings ought not to be beyond the reach of the veterinary surgeon's coo-ee.

THE BRITISH FLOCKMASTER'S AND VETERINARY SURGEON'S OUTLOOK.

A PLEA FOR INCREASED SHEEP BREEDING.

By E. MORGAN, M.R.C.V.S., D.V.H.,
Puerto Cabello, Venezuela.

THE British farmer during the last four years has had no cause to complain, as he used to, that he suffers on account of the keen competition of the foreign market. The cry to-day is "Strain every nerve and muscle in the body so as to make Great Britain as near as possible a self-supporting country." Leaving apart altogether certain products which are tropical and require more sun heat, and other elements that are not in sufficient quantities in Great Britain, is it possible with the population more or less as it is to-day to make Great Britain a self-supporting country? I should decidedly say No. Yet it has been already proved, during the last four years, what great improvements can be made by everybody getting their shoulders to the wheel. For various reasons it is doubtful, after the war is over, whether the home produce will be equal in quantity to what it is at present. The vast areas which have been ploughed during the last four years will not continue for long yielding crops without sufficient manure, although much of the land ploughed was virgin soil; but virgin soil in Great Britain is not going to last as long without farmyard manure as land in other countries, such as Canada or the tropics. Undoubtedly, thousands of acres in every district have been ploughed which were of more value as pasture than arable land, as many farms are composed of such land, which is of hardly any value whatever for corn production, but was quite useful for grazing purposes as every farmer is compelled to plough more land, and many have no choice of land, so thousands of acres of poor, cold clayland in every parish have been put under the plough. It is doubtful if it will pay the farmer after the war is over to cart his manure to such land; yet he must try and get it to yield pasturage of some kind. It will take the average farmer years and years to get this land to be anywhere near as useful as before. Farmers have to sell hay, straw, etc., in greater quantities than in pre-war days. Where are they going to get the manure to compensate the land for this loss? Artificial manure, as we all know, is of itself not sufficient to replace the farmyard manure. Again, many of the young men at the war will meet new friends from abroad, who will inform them of rich fields and pastures new, where the soil will yield crops in abundance without the labour of carting manure, and undoubtedly many ex-soldiers will emigrate. Also it is doubtful whether the lassies are going to continue doing the work of the laddies in the fields after the war is over. All these things remain to be seen. According to Goldsmith, "There was a time, ere England's grief began, when every rood of ground maintained its man." That particular grief we all know will not come again. The days of the usurper were days of yore.

One thing of importance which should be kept in view is that wherever possible the flocks should not be allowed to decrease in number. As a rule, when agriculture is advancing, the number of sheep is decreasing, for various reasons which I will later on explain. There is going, I think, to be a better market yet for sheep than even to-day. Let us give a few comparisons between the past and present, in order to make it clearer, and also that we should make every possible effort to study the diseases of sheep more thoroughly than has been done in the past. We must admit that there are many diseases of sheep about which we are at a loss regarding the cause. The veterinary profession is almost blameless for not making a special study of the diseases of sheep, as primarily the country in general should give more assistance.

It is less than thirty years since the first Frigorifico or frozen meat works was opened in South America—in the Argentine Republic—and whether or not it was designed by a Britisher, it was, soon taken over by one. Not so many years ago they could buy any required quantity of sheep delivered at the meat works for very low prices, viz., fat ewes from 3s. 6d. to 5s., and fat wethers from 5s. to 10s. a head, whereas now the prices have increased, so that they cost at least twenty five and thirty shillings a head. Again, the expenses of slaughtering and freezing and the freight over to England is a considerable item to be added to the cost price of the sheep.

Previous to the advent of the frozen meat trade, they used to keep the sheep for the sake of the wool alone ; sometimes they would make use of the tallow ; when the ewes grew old, and would not yield a great amount of wool, they used to destroy them in different ways, so as to get rid of them. Almost the same can be said regarding the cattle in the past in South America, because not many years ago they used to kill them in Venezuela and other Republics for the sake of the hides, and allow the birds and wild animals to devour the flesh. If we take the Argentine Republic, for instance, a country which contains the greatest number of sheep in the world, with the exception of Australia, the latter country in the year 1914 had about 85,000,000 sheep and Argentina had about 80,000,000. These statistics from different countries give us approximate numbers, but they cannot possibly be absolutely correct any more than the statistics of sheep in Great Britain. The bigger the area the less correct are the statistics. There are cattle even in South America dying of old age on the plains which have never been caught once for branding. In Argentina there has been a diminution in the number of sheep between the years 1908 and 1914 of 23,986,302, and 3,249,862 in the number of cattle.

Argentina has long been one of the most important sheep-raising countries of the world, as its vast grassy plains and favourable climate made it an almost ideal pasture ground for large flocks. According to a representative at Buenos Aires, they consider that sheep-raising does not pay on land that is suited to agriculture, where transportation facilities permit agricultural products to be shipped to market ; so it has come about that the growth of railroads in Argentina, bringing in their wake farms and plantations, has steadily driven the sheep-raisers farther and farther into the pampas. The province of Buenos Aires is gradually changing from sheep to agriculture ; the same thing is true with regard to Entre Rios. The provinces of Mendoza and Cordoba are largely agricultural, although a type of sheep is found in those sections known as "criollo," whose wool is used for carpets. The northern part of the province of Buenos Aires was previously devoted principally to the Rambouillet sheep. This is now one of the principal agricultural zones of the Argentine. Owing to the demand for large animals for meat purposes, and to this section lying nearest of all to market, Lincolns came to largely replace the Rambouillet. Considerable difficulty is being experienced from liver flukes in this section. The Lincoln sheep have deteriorated in this territory, and the decline in six years is said to be 7,000,000 head. Owing to the danger of inundation there is little or no sheep-raising in the eastern part. In the West agriculture is replacing sheep at a rapid rate. The South is particularly good for sheep-raising, and it is in this section that the sheep industry has declined least. In the North a strip of land thirty miles wide, at the foothills of the Andes, provides the best pasturage for sheep. The best of this land will carry from 2,000 to 2,500 sheep per league of nine square miles.

The lands along the Straits of Magellan have an approximately equal capacity. The record is 5,000 sheep per league, which figure was carried on Chilian territory near Punta Arenas. The land along the coast has a much smaller carrying capacity. Aside from the Andes region the sheep-raising in the interior of the provinces is largely limited to the valleys of the numerous rivers tributary to the Santa Cruz and Chebut, and flowing directly to the Atlantic. A very severe winter is experienced in some of the higher regions every seven or eight years. It is a peculiar coincidence that some of these bad seasons come in pairs—for example 1898-1899, 1904-1905, 1913 and 1914 were all characterised by heavy loss in various parts of the Patagonian region. A bad winter is not general in its effects, but occasions loss only in certain localities. The lamb mortality depends entirely on the care exercised by individual ranch owners. Under ordinary conditions an average of 30 per cent. loss may be estimated in lambs up to one year old. Sheep scab is said to be prevalent in the Argentine in certain districts.

The population of Argentina is increasing, and large towns like Buenos Aires need a large amount of the meat from the country for their inhabitants. The population of Argentine, is estimated to be 8,000,000 and in about twenty years it is expected to be from 20,000,000 to 25,000,000, and as the population increases agriculture will extend, and, as already stated, less sheep will be kept on the land.

In Venezuela there are but few sheep kept, and they who keep these few take but little interest in them; they do not even take the trouble of shearing them. I asked a farmer recently what was the reason given for not clipping and dipping the sheep in a tropical country, and where ticks are a plague to animals. He said that sometimes they were pulling the wool off the sheep's backs. He asked me if I would care to call one day and teach his son how to shear the sheep. I did call, and the sheep were already in the yard with the growth of several years on their backs. I asked him for a pair of shears, and he brought me a small pair of scissors about three inches long, and said that he thought them good enough. Such is their knowledge about sheep in Venezuela, a country with an area three times that of Great Britain.

From statistics taken and the comparison between the United States and some of the chief European countries, it shows that the consumption of beef and veal combined was 7,652,000,000 pounds dressed weight in the United States in 1909. In the United Kingdom in 1906 it was 2,644,000,000 pounds; in Germany in 1913 it was 2,555,000,000 pounds; in France in 1904 it was 1,685,000,000 pounds. The consumption of beef and veal in the United States is greater by a large amount than that of the United Kingdom, Germany and France combined.

The comparison with respect to the consumption of *mutton and lamb* is very different. The quantity for the United Kingdom is 1,139,000,000 pounds; for the United States 602,000,000 pounds; for France 353,000,000 pounds; for Germany 128,000,000 pounds. The *United Kingdom consumes more mutton than the United States, Germany and France combined.* The United States consumes somewhat less pork than it does beef and veal, but Germany consumes nearly twice as much. The quantity of pork and pork products consumption for the United States is 7,196,000,000 pounds; for Germany 4,716,000,000 pounds; for the United Kingdom, 1,349,000,000 pounds; and for France, 1,058,000,000 pounds.

By means of estimates of meat consumption, derived mostly by multiplying discoverable estimates of *per capita* consumption by the population for the same year, it is possible to arrive at a general average per head consumption of meat for the following countries:

United States	1909	171 lbs.
France	1904	79 lbs.
Germany	1913	112 lbs.
United Kingdom for years	1891 to 1908	120 lbs.
Previous to	1891	112 lbs.

For a long series of years—certainly as far back as 1904—Germany has been nearly self-sustaining in its meat supply. In 1913 that country was able to produce 93 per cent. of its enormous consumption of beef, mutton and pork and their products, amounting to 7,400,000,000 pounds. The United Kingdom imports a much larger fraction of its meat consumption than any other country does, and since the *per capita* consumption of the British is a liberal one, the total imports of meat and meat products far exceed those of any other country. The home production of beef, mutton and pork has for many years provided a diminishing fraction of the consumption. On the other hand, the net imports have provided an increasing fraction, and this has grown from 36.5 per cent. in 1890–91 to 46 per cent. in 1907-8.

The net imports of mutton have shown marked tendency to increase as a fraction of the consumption. As far back as 1890-91 they were 25.4 per cent. of the consumption, and with some irregularity, yet with certainty, they increased to 44·1 per cent. in 1907-8.

The number of sheep in Germany shows a rapid decrease between the years 1892 and 1913. I find that in 1892 the number of sheep was 13,600,000, but in 1913 there was a drop to 5,500,000. I have been informed quite recently that the reason given for this increase is something similar to what I have already explained regarding Argentina. They consider that sheep should not be kept on good agricultural land; therefore only those with poor and hilly land retain their flocks. There are also diseases amongst sheep in Germany which account for the death of many of their sheep of all ages. Undoubtedly, Germany and other countries on the continent of Europe will be obliged to import a large quantity of mutton as well as beef and their products for many years to come after the war is over. So it behoves the British farmer, as far as he can possibly avoid it, not to allow his flocks to decrease. We know that there has been a decrease since 1909, but it is trivial when we compare it to that of Germany. Also, Great Britain has been the principal breeding ground of the world for pure-bred sheep. There is a greater danger even at the present time of a further decrease taking place, for obvious reasons, *e.g.*, the high prices, and the fact of the farmer having to cultivate more land and produce more corn, etc. The old-established flocks on the hills will no doubt be retained, where possible, as the owners always endeavour to keep a certain number of breeding ewes so as not to allow the crop of lambs to decrease in number; but, as these flockmasters on the highlands have to winter the yearling lambs in lowland farms, and for reasons already stated it is difficult at this time to find suitable wintering ground for them, and as many of them have to remain on the hills to chance it, there are great risks of having heavy losses. Another reason which accounts for the decrease in the number of sheep, especially in Wales during the last ten years or so, is that it used to be a universal custom among flock-owners on the hills to keep the wethers until they were four years old before selling, but a few years ago the price of these went low down and the price of wether lambs got high, so that many of the flock-owners deemed it wiser to sell the latter than to keep them on until they would be four years old; so, owing to this change the number of sheep got reduced. On the other hand, they are able to keep more ewes on account of this change, but it take several years to make up the deficiency. Besides, selling young sheep from the hills means that the farmers in the lowlands have to fatten them, whereas the old wethers are almost mature for the butcher when leaving the hills, and would have been grazing most of the time, both summer and winter, on the hills. Also the farmers in the lowlands could keep some other stock to consume what these particular lambs nowadays consume.

References:—
1. The National Provicioner.
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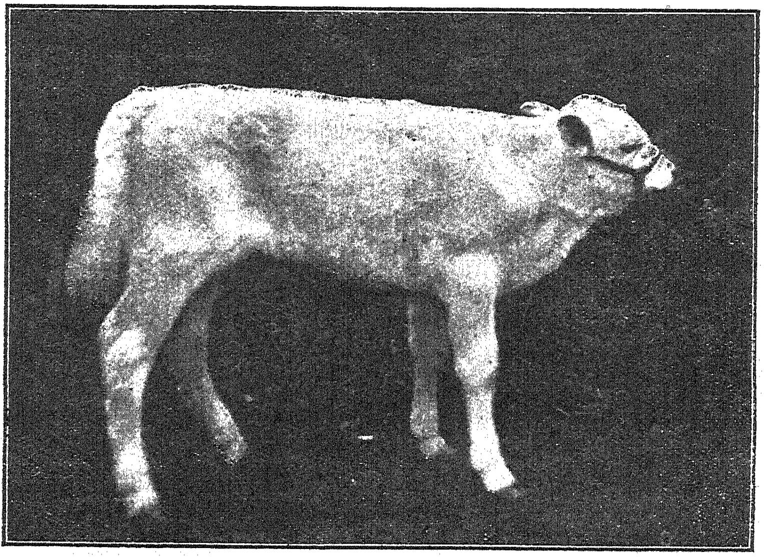
ECTOPIA CARDIS.

By W. LOTHIAN, M.R.C.V.S.,
Duns.

I enclose a photograph of a calf with ectopia cardis. I think if anything No. 1 shows it best. When this was taken the calf would be about a month old, and was bred from a cow of the shorthorn type. The heart is situated outside the thorax in the lower third of the neck, the base towards the entrance to the thorax and the apex pointing upward and forward. The attendant noticed the lump some time after birth and on feeling and pressing it the little animal fainted and fell.



The health of the calf was good, it was lively and took its milk greedily. After any exertion the breathing seemed accelerated beyond what it would have been in an ordinary animal.

Milk being very scarce and seeing it would be easily hurt if sent away to a market it was decided that the most humane thing would be to destroy it. This was done and the *post-mortem* showed the heart to be nearly the same circumference throughout, the apex being bluntly rounded, which made the organ cylindrical instead of conical.

WIND SUCKING IN A COW.

By W. LOTHIAN, M.R.C.V.S.,
Duns.

THE subject of this notice is a four-year old half-bred Ayrshire cow, and was one of two which I selected from a dealer for a client. They were to be kept till calved and purchased subject to passing tuberculin test.

About a week after I met the dealer and he informed me that this cow had calved, but had been noticed a number of times holding her head up, making some noise and sucking wind he thought. Being interested, I called, but did not succeed in seeing her doing anything unusual. Shortly after the other cow calved, and I called again to inject the tuberculin. I had better luck this time. While preparing to take temperature this cow, which was in next stall, put her nose up as high as she could and commenced in real earnest to suck wind. In a very short time the rumen was quite distended. I slipped forward, and putting my hand on under side of neck, felt the wind at very short intervals pass down the œsophagus. She did not smack the lips, but made a sort of quick, "slobbering" noise in which both lips and tongue took part. Shortly after this eructation took place and part of the air was expelled.

The act was oftener seen at night after being watered and fed with cake. She was in nice condition and good health. The owner could prevent her by tying her so that she could not raise the head above what she would hold it when standing at rest. Her history is not known, as she had been bought only a few days before I first saw her.

INTERESTING CASES.

By HENRY B. EVE, M.R.C.V.S., *Folkestone.*

THE EVIL RESULTS OF BLISTERING.

Subject.—Six-year-old bay blood pony, mare, 14 hands, undocked

History.—The test animal had been lame for some 3 months er seen by me, and treated by a V.S. for lameness, which he could no locate, and advised turning out to grass. I had previously insured an passed it sound in 1914. It was sold to another client for £30, as own had been obliged to close his business and join up in Army. The sell gave a written warranty and guaranteed it to stand "sound" for six months with fair usage. However, it turned lame a month after purchase, and a V.S. was called in who diagnosed rheumatism as the cause, and duly treated without success.

Symptoms.—When called in by buyer on August 27th, 1918, I found the pony grazing in field, dead lame on the near foreleg, in good bodily condition. I had it haltered, and walked on the road, and examined it carefully, and came to the conclusion that the injury was deep seated, and undoubtedly a history to the case, if known—breath fœtid, and mouth, gums, tongue and lips slate-coloured.

Diagnosis.—Severe sprain of the "Levator Humeri," old standing, and probably the muscular spiral nerve, or some other injured, as I observed atroply of the muscles present, which indicated that such was the case.

Prognosis.—Unfavourable; advised a blister or seton, and owner agreed to try a blister, which must be painless, if applied.

Treatment.—September 5th, blistered shoulder with Wyley's (Coventry Green Blister) with the usual precautions, and tied animal after on pillar reins. September 6th, client informed me that the blister had not acted, pony never even felt it, and the part blistered was not *a wee bit swollen.* The following morning at 8.30 a.m. he rang up to say that the pony was very queer, mad with pain, and unapproachable, and had thrown itself down in the stall, and I was requested to visit at once. I went in taxi, and found animal down, unable to rise, and showing symptoms of acute tetanus, and plainly saw that it was dying. Trismus present. Animal died in a quarter of an hour whilst I was there. I gave a hypo-inj. of morphia and atropine, and nicotine suppository.

Result.—Made a P.M. same day, and discovered that "rupture of the heart" was the immediate cause of death—perhaps occurred as a result of falling down during a "tetanic spasm." All other organs healthy, bar heart, which was "hypertrophied." There was an excess of adipose tissue, and what I diagnosed as a condition of "Status Lymphaticus," present.

Remarks.—The animal was of a *very nervous* temperament, and I concluded that the blister irritated the peripheral nerve endings in the skin (reflexly), which produced a kind of "hysteria," and affected the nervous system and set up Idiopathic Tetanus. I found *no* wound or skin abrasion present at P.M., although I looked most carefully. I have seen Tetanus occur frequently after wounds (open knee-joints) when a blister has been applied to the edges of the wound with a view to closing orifice, but I have never seen it after blistering when no wound or abrasion of skin is discernible. I see Prof. Williams says he has known it occur after slightly blistering one foreleg.

I have used Wyley's blister extensively and consider it painless, and far superior to any other on the market. The first case I have encountered since qualifying in 1896. Have any other readers had similar experience with fatal results ? My experience is that Idiopathic is more fatal than Traumatic Tetanus.

POST-PARTUM INFECTION IN THE SOW.

Subject.—A valuable pedigree sow, middle white breed, which was in a very fat condition, heavy in pig, and insured by me along with 180 other swine against Swine Fever at Lloyd's; the property of a large breeder in Kent.

History.—On Sunday, Sept. 8th, I was called in to attend her, as she was unable to farrow, had been in labour for some time, and was straining violently without any effect bar pushing her bowels out —so attendant (a soldier) informed me on the phone. (Eversion of rectum.)

On arrival I found trouble, and that he had delivered her of a dead pig, breech presentation, with considerable difficulty. On examination I found another one stuck fast, cross-presentation, which after some considerable patience I eventually rectified and delivered dead, and could feel no more within reach.

Diagnosis.—Presumed that I had a litter of dead pigs to deal with.

Prognosis.—Unfavourable, as the sow seemed completely prostrate, and was a bad subject, being in a plethoric condition.

Treatment.—Gave a diffusible stimulant draught, ether, sulph. meth. ol. terebinth and ol. lini., as animal was very constipated, and a glycerine injection rectally, allowed her an hour's rest, and decided to call again later. Re-examined—no forrader. "Uterine inertia" present; decided to try hypo-inj pituitrin (3cc.) and wait and see. Twenty minutes afterwards its action commenced, and continued for about one and a half hours, and to my delight the sow voluntarily delivered twelve more dead pigs, all fully developed. I inserted hand again to see if womb was at all "tetanised" after the injection of "Pituitrin," as I had never tried drug before on sows, only bitches, and always with good results. No sign whatever of bad results, merely a good evacuation of the bowels, and considerable diuresis, at which I was highly delighted. Syringed uterus out with (P.D. and Co.) mercuric iodide tab. twice daily. (1-1000).

Diet.—Drenched whiskey, eggs and milk, and oatmeal gruel, which was voluntarily taken, animal being very thirsty.

Result—Next day sow showed symptoms of "Puerperal Infection," was completely prostrate, and fœtid diarrhoea continued, streaked with blood. She lay down with her head between her fore legs, like a bitch, and took no notice of surrounding objects. There were fits of dry, hard coughing, and a muco-purulent discharge from the nose, as if "Septic pneumonia" was developing. She was weak, and staggered when she walked, and only did so when made to. She refused all food, and had to be drenched. The eyes were dull and sunk in sockets and milk all gone, and the animal's whole appearance suggested one of "General Infection" and abdominal pain, indicating "Septic Metro-Peritonitis" present.

Treatment.—Gave hypo-inj. mixed Phylacogen 30cc. (Parke, Davis & Co.) daily, and Quinine salicylate internally as a tonic, and Liq. paraffin.

Remarks.—Recovery in about 10 days, to my surprise. It appears that amongst the sequelæ to parturition when puerperal infection is established, the intestines become the seat of infection, in addition to other organs, notably the lungs. The paraffin I am giving daily in the feed war ration meal, to counteract the indigestion arising and constipation therefrom.

SCURVY (SCORBUTUS) IN YOUNG PIGS.

Subjects.—Small stores which had been recently purchased from a farmer and dealer in rather a large way by a syndicate and insured against swine fever.

History.—They had been fed ere bought mainly on sharps and swill collected from various military camps; since on potatoes and war ration mealies, and stabled in newly erected, up-to-date sites with concrete floors, and runs exposed to the full glare of the sun.

Symptoms.—Pigs appeared unthrify, anæmic, showed a great disinclination to move in any way unless made to do so, hair rough and unkempt and skin in a very irritable condition, judging by the way they rubbed themselves against the trough, posts, etc., which seemed to give them pleasure. Two, however, were evidently very ill, and on being handled I noticed a diffuse swelling, like "Periostitis," present over the metacarpal and metatarsal regions, which was painful on manipulation. The feet also seemed sore, mouth hot, with a sour odour, breath fœtid, temperature high, and constipation, at first followed by sour diarrhœa, and great thirst present when I visited the premises.

Diagnosis.—Query doubtful!

Treatment.—Isolated the two ailing ones; one died next day and the other a few days after, so revisited, and made a *post mortem* on the carcass, which was interesting and instructive.

Post-Mortem Lesions.—Lungs showed a few small petechial patches under the serous coat; no pneumonic consolidation present. Heart, liver, spleen normal. Stomach and small intestines congested, the latter in a state of "Intussusception," the invaginated portion being situated at the terminal portion of the ileum, where it joins the cæcum. The cæcum being completely reversed, the fold was unable to be pulled out, fixed; the surrounding area intensely inflamed, indicating that the invagination occurred ere death. The solitary follicles of the large intestines were prominent, but there was no ulceration present or swine fever lesions present.

Leg Lesions.—Swellings and contents were easily evacuated by squeezing same and bowel washed clean. Section of periosteum revealed an exudate present on its under surface. The periosteum stripped easily, leaving the bone bare.

Treatment.—Changed the food mealies and potatoes entirely, substituting grass (machine mown available), cabbages, lettuce, and carrot top leaves. Gave internally bismuthated-magnesia, soda bicarb. and potash bicarbonate. Limewater in skimmed milk locally applied to the skin, sulphur praecip. zinc oxide, liq. calcis, train oil to allay itching. Put ashes (fine coal) down in stye, and fixed an awning over the runs to counteract the heat, which was intense at the time, which the pigs fully appreciated.

Result.—No. 2 died a week after No. 1 and was duly reported to the police as a suspected case of swine fever, and a *post mortem* made by a F.R.C.V.S. sent by the Board A. and F., who certified it was not swine fever. The rest have all recovered and are fattening well up-to-date, and no untoward results.

Remarks.—I have named the complaint the above for want of a better, as the appearances presented suggested to my mind the possibility of the case being analogous to disease known as "Scurvy Scorbutus" in the human being, which I have seen, but find no mention of in textbooks available—hence penning these few clinical notes.

SPRING TIME CASES.

By RICHARD JONES, M.R.C.V.S.,

Towyn Merionethshire.

In May, 1915, I was asked to attend a mare with the following history:—"The mare had foaled seven days previously, and since foaling had an abnormal way of urinating. She would lay herself out to pass water, the same being voided with one gush; evidently there was something wrong with her water."

I found the mare and foal in a loose box—a big, lanky, loosely coupled specimen, a type of mare to have large coarse foals, which proved to be the case from future foalings. Nothing could be seen from a casual examination leading one to think that the bladder had been everted during foaling. The pulse was practically normal, and the temperature, still there was something showing that she was not altogether comfortable.

When I dilated the vulva I immediately saw that the bladder was out and appeared a congested, elongated, round mass. The external parts were washed and I smeared the bladder with carbolised oil and did so frequently during my efforts to return the same. We had some difficulty in keeping the mare quiet, and it took from three-quarters to one hour to return it. At one period of the operation I thought I would have to give it up as hopeless, but I stuck to it and eventually the bladder was returned. I pushed the organ "right home" with a female glass syringe. In three days I was informed that the patient was not so comfortable as she had been, so I went to see her and syringed about three ounces of weak carbolised oil into the bladder. No further treatment was required.

In 1916 the mare did not breed, but I believe she was served in due course after her recovery.

In 1917 she foaled, and during the action the bladder was everted. Nothing was to be seen when the mare was standing, but a portion of the bladder was visible when she was in a lying position. The owner and the hands knew this time what had taken place, so I was sent for as soon as possible. The mare foaled early in the morning and I arrived late in the afternoon of the same day. I did not have the same difficulty in replacing the bladder on this occasion as I had in the first instance.

The owner and myself discussed the wisdom of putting to a horse again and finally decided to give her another trial.

In 1918 the foal proved to be a very large one, a normal breech presentation, and a good deal of traction was applied to effect delivery. The bladder was again everted either before or during the act of foaling. I found on examination that the bladder had come out to the full length of its neck and had tumbled forward into the ballooned vagina and kept in that position whilst the mare was standing, but as soon as I put the mare down the whole of the bladder hung outside the vulva. For some time I tried to replace the bladder with the mare standing, and of course this would have been easier, but she became dangerously restless so I put on hobbles and cast her. I had hard, tedious and tiresome work on the first occasion, but nothing like the trouble I had the third time, to replace the bladder. When I had finished I told the owner "No more," and he agreed.

The interesting feature of this condition is that the same mare for three consecutive foalings should have her bladder everted.

Early in June of this season I had a telephone message to attend a mare which the owner thought was in the same condition as the case which I have just described. This case was about ten miles from the other, but the fact of the first having everted the bladder on three occasions had given rise to a good deal of talk amongst the farmers, and the symptoms exhibited by this case had become well known. The owner of this mare felt quite certain there was something wrong with her bladder before I arrived, which proved the case on examination. This mare's bladder had been out forty-eight hours. I found it half to three-quarters of an hour's hard work. Standing behind the mare I used both hands at the same time to manipulate the bladder into its proper place again, in this case lubricating the organ often during my efforts. No further treatment was required and the owner decided to put her to breed this year again, although knowing the happenings to the first mare described, as he was anxious to have her stock.

During my thirty years' practice these are the only cases of eversion of the bladder that I have had to deal with, and I believe that I have not failed to diagnose any that I might have had to deal with.

I may say for the information of young practitioners that it is tedious and laborious work, and it is exceedingly important to be careful that the fingers do not damage the bladder during the manipulation.

A FEW ERRORS IN DIAGNOSIS AND TREATMENT.

By "CANIS MAJOR."

Most of us at some time or other have been guilty of the above, each instance impressing itself upon our memories in a none too pleasant manner, but serving to fulfil a useful purpose in avoiding future errors of a similar nature. It is with the object of inducing others to relate similar experiences which may serve as a useful guide that I relate the following cases:—

(1) Two-year-old cart colt in very poor condition, the property, fortunately, of a farmer friend who had consulted me as to its lameness of the near hind limb. The colt, not easily approached, was in the field upon my visit, each movement of the animal being accompanied by a distinct clicking sound, whilst at the same time the patella of the affected limb was seen to be slipping on and off its base. Diagnosis—partial luxation of the patella. Imagine my consternation three days later to find that matter had appeared at the coronet. However, all's well that ends well. Under suitable treatment the animal recovered, but for some time I had to endure a good deal of chipping from my farmer friend.

(2) Hunter, lame off hind; considerable swelling of posterior part of fetlock joint, accompanied by acute lameness; pain on manipulation. Synovitis appeared to me at the time to be the cause of lameness, treatment being applied accordingly, and consisting of refrigerant lotions and cold water bandages. I did not myself see the case again, my employer, for whom I had been acting in the capacity of *locum tenens*, upon his return a few days subsequently being urgently called in to attend, when, lo and behold! pus formation was discovered just on the point of breaking out at the coronet. Relief was afforded from below and the case progressed favourably. My employer, a very generous man, was very kindly in his criticism. What the owner's feelings and expressions were I never heard, the latter none too favourable, I fear.

(3) This case, whilst also showing want of care and thoroughness, may not fall quite precisely under the heading, but records one of my many discrepancies. Called to a cow unable to calve, the case being one of breech presentation, after a time presentation was effected, when, after attending to the patient's general comfort, I left, stating that I would call again on the following day, as was my usual custom in such cases. I was informed on arrival that the cow had been in labour for some hours, when on exploration I discovered the presence of a second calf, which I delivered with little trouble. The first two instances impressed upon me ever since the golden rule to examine very carefully the foot, even though the patient was obviously lame in the shoulder or hips, and never since my third case have I failed to examine and explore the uterus carefully after remedying dystokia.

(4) Cow very lame, accompanied by great swelling over the region of the shoulder, the lameness having been of some duration. The presence of a large quantity of pus could be easily detected. Being young, keen on surgery and the knife, my first thought was to evacuate the contents of this swelling. A good opening was made in its walls and a tremendous quantity of pus evacuated. Upon digital exploration of the cavity, much to my horror I discovered sharp edges of broken bone. Result was that I had converted a simple fracture into a compound one. The butcher in this case completed further treatment.

(5) Shorthorn cow, appetite entirely in abeyance, milk suppressed, temperature subnormal, presenting a going-home appearance, was by my advice and faulty prognosis sold to and destroyed by a third-rate butcher. The carcase when dressed showed nothing abnormal, and was to all appearances fit for human consumption. The owner, fortunately for me, never heard the true facts of the case. The butcher however, had, as he explained to me afterwards, a highly satisfactory

deal, and much to my disgust ardently desired to make me a present on the strength of the deal.

(6) This was a gross care of carelessness, and concerned with the treatment of a case of parturient apoplexy, at a time preceding the introduction of the air or oxygen treatment, but early in the period of Schmidt's method when iodide of potassium in solution was employed. Starting off in a hurry to this case, some miles away, I neglected to prepare a sterile solution of this drug, taking only with me the syringe, and the necessary quantity of pot. iodid. inthe solid, intending to make the solution on arrival. Dirty utensils and imperfectly sterilized water completed the damage. Bad results followed within twenty-four hours, death occurring from septic intoxication. Here I had to congratulate myself that the cause remained undiscovered except to my guilty self, death being attributed by the owner to milk-fever.

The foregoing cases are only just a few instances of my many errors, and I trust will not receive too keen criticism, and more particularly do I trust that this issue of the VETERINARY JOURNAL does not meet the eye of the layman or farmer. My only defence is my youth and inexperience at the time, and at a time when I myself should have considered such lack of judgment unforgiveable in others, now, after an experience of nearly twenty years can view with equanimity and justice corresponding faults of my younger professional brethren.

PURPURA HÆMORRHAGICA.

BY W. H. BROOKE, M.R.C.V.S.,
Handsworth.

THE subject was an aged black mare of the heavy vanner type, which on June 1st last was found to have naso-pharyngeal catarrh of an acute nature. Pulse 55, respiration 14, temperature 104° F. Appetite poor and throat acutely sore. The animal had been kept at work for three or four days in this condition, and a week previously had been turned out on a poor pasture after having been much overdone at work. When brought up she was put in a reduced condition to long boating journeys and so was much devitalised when submitted for treatment. Improvement was shown in response to treatment for a week. Appetite returned and acute symptoms abated, but at this period I received an early morning telephonic call from the horse-keeper, who told me that the mare had developed tumour of the near hind leg. Before I saw the mare I suspected what was the matter, and on arriving at the stables I found the near hind leg swollen from pastern to the middle femoral region, where it had the characteristic abrupt shelving termination. A bloody ooze was present at the anterior aspect of the near hock and from both hind heels.

Breathing accompanied by a snuffling sound and a blood-tinged discharge issued from both nostrils, the lining membrane of which showed patchy capillary hæmorrhages. There was some swelling of the nasal alæ, which in a few days extended upwards for about eight inches. Other swellings had also developed in the off hind and near fore limbs, and by now though the enlargement of the near hind leg was reduced, a most offensive odour was noticeable, which I at first thought emanated from the lungs, as it was very similar to that given off in gangrenous pneumonia; but on closer examination it was found to issue from the hind leg, the skin of which was separated in extensive areas over the flexor aspect of the fetlocks and parts immediately above and anterior parts of the off hock, and discharging a bloody, offensive pus. And now the skin covering the fetlock, heels and flexor aspect of hind leg, fronts of both hocks, near shoulder and outer femoral region of the near hind leg, began to harden, and at points of junction with the normal skin it became divided through movement from which the discharge issued. Later, the affected tracts of skin became drier and mummified, some of which was removed and in other places commenced to slough. With the skin-separation, which involved all the originally swollen parts except the head, the general health improved The lungs, which soon after the advent of purpuric symptoms had become seriously involved, now settled, the pulse reduced to 46 and temperature 101°F; respirations nearly normal. The bowels, which had been discharging soft dark-coloured fæces, became natural. The animal had generally improved, moved without difficulty and fed well; but after removing large pieces of mummified skin, other large tracts began to slough and hung in ribbon-like pieces. So extensive was this that treatment had to be abandoned and animal destroyed. Post mortem showed the lungs to have almost completely recovered, only small areas in the anterior lobes being affected. Other parts were all but normal. The treatment when purpura became evident consisted in a couple of early doses of anti-streptococci serum, and later one or two doses of adrenalin in addition to medicinal agents which on, account of throat and lung conditions, were administered in electuary form and included potas. chlor; soda salicyl; ext. nux. vom., ext. digitalis and potas. iod.

The chief interest of the case, however, centres in the pathological condition of the skin. What could have determined the extensive sloughing, and why, considering its extent, was the animal not only free from general sepsis, but showed apart from the skin so manifest an improvement?

I think we may reasonably conclude that the injection of protective serum gave freedom from pyæmia. Is it likely that any agent used in treatment affected the course of the skin lesions? Would the adrenalin injections be likely to exert an influence in this direction in spite of its general good effects? In controlling capillary leakage in parts not so gravely affected, is it possible that it shut off nutrition from parts deeply involved?

I think that the value of adrenalin in its general good effects is unquestionable in this disease; but it no doubt calls for discrimination in its use. Adrenalin is said to produce its effect by direct action on the muscular tissue itself, voluntary and involuntary, and not to act through the vaso-motor centre, but necessarily through the medium of the terminal sympathetics. It has a diabetic influence.

What would be the effect of adrenalin upon the vessels of parts affected by purpuric extravasation? Many of the smaller vessels of such parts would be occluded altogether, and not permeable to its action, while in other cases the vascular porosity would probably allow of the astringent action of the drug in serivascular areas, propulsion being aided also by the more powerful cardiac systole, thus causing further occlusion. The lymphatics would be similarly affected. Such conditions would be likely to tell seriously and immediately upon parts so damaged.

I think the reasonable conclusion would be that although admissible in moderate purpuric extravasation, when this is so acute as to cause bloody ooze, it should be withheld.

CASE OF DIGITALIS POISONING.

By J. W. POLLOCK, M.R.C.V.S., *Lockerbie.*

THE animal was a Clydesdale filly, 3 years of age. She had been ill a day or two before I saw her. The symptoms were those of approaching coma: when walking she staggered on the hind legs and extended the fore legs in an uncertain manner; she was apparently quite blind; there was some salivation, but not profuse, and the buccal mucosa was slightly inflamed. The pulse could not be felt, and on auscultation the heart-beats were very slow and scarcely audible. The temperature was about normal (internal and external) but the respirations were quickened and weak (shallow). The fæces were scanty, hard, and partly covered with mucus. All food was refused. The filly died in coma twelve hours after these symptoms were observed. After death decomposition was not rapid. The filly had been at grass and was getting no other food. In the field there was a deep gully with a stream, and on the one side of this gully there was a considerable area occupied by *Digitalis Purpurea* alone. The plants had been freely eaten, and the chewed stalks were found lying about. No *post-mortem* examination was made.

NOTES ON MASTITIS IN CATTLE.

By J. W. POLLOCK, M.R.C.V.S.,
Lockerbie.

THIS is a disease of the summer more than the winter. It varies very much in its effects (both systemic and local) on the affected animals. In my experience it is very common during the months of July and August, and rare during the remainder of the year, and during these months heifers which have not calved are as liable to get the disease as are dairy cows, although the heifers are usually approaching the end of the pregnant period. In some cases the fluid, which can be "drawn" from the diseased quarters of the udder, is very septic, and the systemic disturbance is consequently serious, death not infrequently being the result; and in a few cases gangrene of one or more teats and part of the udder occurs with an accompanying septicæmia. The formation of abscesses in these summer cases is rare. Even in the milder cases the milk secretion is never restored in the diseased quarters of the udder for the same season. In those cases in which the whole of the secreting cells of the quarter have not been destroyed by the disease, the milk secretion is restored at the next "calving," but in many cases the quarter remains "blind" and of a hard, fibrous nature. On the other hand, in those infrequent cases occurring in the other months of the year, the restoration of the milk-secretion to the diseased quarter is the rule, even in the same season, although in diminished quantity; these cases are not usually septic. It will be observed that the summer cases appear with the advent of the fly-season and disappear with the departure of the flies—at least when flies are most numerous. Cows with abrasions and "cracks" of the teats are more liable to the disease than cows with "clean" teats, and I have often noticed a cluster of flies on the "point of the teat of a diseased quarter. Is it not likely that flies are the carriers of the bacteria, which cause the summer varieties of the disease? Cows with small teats are more liable to the disease than those with large teats. These small teats are apt to become well moistened with milk during the milking process, if done by hand, and the milk will attract the flies. With regard to heifers and cows approaching the "calving," the small grain of "wax" at the "point" of the teat may be food for them.

The losses to dairy farmers from this disease every summer are considerable, and the disease should be further investigated. Antiseptic injections have not proved to be very satisfactory.

Abstracts.

BLOOD-SUCKING INSECTS AS TRANSMITTERS OF ANTHRAX OR CHARBON.

Anthrax or Charbon is one of the common live stock diseases in certain sections of Louisiana. Sporadic cases of the disease occur during the greater part of the year, but enzootics always appear during the warm summer months. Several theories have been given concerning these outbreaks—namely, previous infection, favourable climatic conditions, neglect in the proper sanitary care of anthrax carcasses, blood-sucking insects, and many others.

In work carried on in the Louisiana Experiment Station for the past three years an attempt has been made to find out the relation between blood-sucking insects and the transmission of anthrax. In the past a few articles have been published concerning the transmission of anthrax by biting flies.

In the review of literature on anthrax very few data have been given concerning the transmission of this disease by the biting of blood-sucking insects. Schuberg and Kuhn,* in 1912, transferred anthrax infection from a cadaver to a living animal through the biting of *Stomoxys calcitrans*.

The most extensive research work along this line has been carried on by Mitzmain,† who succeeded in transmitting anthrax through the bites of *Stomoxys calcitrans* and *Tabanus striatus*.

In Louisiana, Dalrymple and Dodson,‡ as early as 1900, gave a record showing the relation of the density of the blood-sucking insects to the outbreak of anthrax. But while they were more or less positive in their opinions, based upon what seemed strong circumstantial evidence, they did not submit any direct proof at the time of transmission of infection by the flies.

After observing several enzootics of anthrax in Louisiana it appeared that some unknown factor was playing a prominent part in the continuance and spread of this disease. For that reason a study of some of the most common blood-sucking insects was undertaken in the pathology laboratory of the Louisiana Experiment Station.

The following article is a report of the work to date. Many phases of this subject have not been touched in this report. It is hoped that the results given will assist in the sanitary control of anthrax in Louisiana.

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* Schuberg and Kuhn. Ueber die Uebertagung von Krankheiten durch einheimesche stechende Insekten. Arb. a. d. kais. Gesundheitsamte (1912), Heft 2, Bd. XL, 209-234.

† Mitzmain, 11, Summary of Experiments in the transmission of anthrax by Biting Flies, U. S. Public Health Service, Hygienic Laboratory Bulletin No. 94 (1914).

‡ Dalrymple, Louisiana Bul. No. 60 (1900).

The purpose of the experiments was to test the possibility of anthrax transmission through the biting of blood-sucking insects. As enzootics of anthrax occur during the prevalence of these insects, it was considered possible that the anthrax bacilli might be carried on the proboscis of an insect to healthy animals after having fed upon an animal sick with anthrax. All experiments were conducted with experimental animals under as nearly natural conditions as possible. Pure cultures of anthrax spores were used in producing the disease.

The flies used in these experiments were *the horn fly, Hæmatobia irritans L.*,* and a horse fly, *Tabanus sp.* This horse fly was sent to the U.S. Bureau of Entomology to be identified. Mr. Frederick Knab reported that the species was *Tabanus sp.* near *nigrovittatus* Macq., apparently undescribed.

The mosquitoes used were *Psorophora* (*janthinosoma*) *sayi* D. & K. and *Aedes sylvestris* Theob. These determinations were also made by Mr. Knab.

TECHNIQUE.

Guinea pigs were inoculated with a loop of anthrax spores injected subcutaneously or into the abdominal cavity. These inoculated guinea pigs were used as sources of infection except in one experiment where a sheep was used. The same strain of anthrax was used in nearly all the experiments and proved to be very virulent. Death would occur in adult guinea pigs twenty-eight hours after inoculation, or sooner in younger animals.

The Horn fly is one of the most predominant of all the species of blood-sucking flies. It is prevalent during the greater part of the year, and is found, during the summer months, in swarms feeding upon cattle, more especially upon animals with dark coats, to evade detection.

The flies were collected in a net from the black cattle on the Experiment Station farm. Very little difficulty was experienced in collecting the Horn flies in this manner, and very few other species of flies were found among the large number collected But, as with other workers, great difficulty was experienced in keeping the flies alive in captivity, due to the fact that if left unfed for twelve hours they would practically all die. Frequent feeding upon a living animal was found necessary if they were to be kept alive for any length of time.

The Horn flies were confined in a cage, which was a wooden box with curved open top covered with fine wire screen. The number of flies used in a cage would vary from one hundred to three hundred.

The guinea pig which had been previously inoculated with anthrax was tied on the cage and allowed to remain for one minute. Then, after removing the animal, the screen was disinfected with a 1-1000 bichloride of mercury solution to eliminate the danger of infecting the healthy guinea pigs through skin lesions. The healthy guinea pig was then fastened on the cage and allowed to remain from one to three minutes. The horn fly will usually feed from three to six minutes. By this method the feeding was interrupted, being started on one animal and continued or completed on another.

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* This fly is so called because it has the habit of clustering in great numbers at the base of the horns of cattle. As a cattle pest it has few equals. It is about half the size of the common house fly, and is very prevalent in the San Joaquin Valley, California.—G. M.

The length of time which elapsed between the time of feeding on the infected animal and its death was noted in every case in order to determine at what period in the development of the disease virulent organisms could be transferred by the flies. The animals used were in different stages of the disease, ranging from six hours before death to thirty minutes after death.

In some experiments the hair was removed from the abdominal surface of the guinea pigs, but this was not necessary because it did not seem to affect the percentage of infections produced

The results of these experiments are given in Table I :

TABLE I.

ANTHRAX TRANSMISSION BY THE HORN FLY.

Length of Time from Death of Infected Animal.	Number of Guinea Pigs Bitten by Flies.	Number Dying with Anthrax.	Percentage of Infection.
Six hours before death	10	0	00
Five hours before death	18	0	00
Four hours before death	17	2	11
Three hours before death	15	3	20
Two hours and thirty minutes before death	15	4	26
Two hours before death	14	3	21
One hour and thirty minutes before death	16	5	31
One hour before death	20	8	40
Thirty minutes before death	22	12	54
Fifteen minutes before death	20	10	50
Five minutes before death	20	11	55
At death	15	5	33
Fifteen minutes after death	10	1	10
Thirty minutes after death	12	0	00

After death all guinea pigs were posted and bacteriological examinations made of the blood taken from the spleen. All doubtful cases were cultured and animal inoculations made to prove results

The above table shows that the flies feeding upon an infected guinea pig four hours before its death transmitted the disease to healthy pigs. In only one instance was the same result obtained by the flies feeding upon an infected carcass. The results indicated that the greatest number of transmissions took place a short time before the death of the infected host. This was due to the fact that anthrax bacilli became generalised in the circulation of the animal a short time before death. The horn fly would not feed upon the infected carcass of a guinea pig satisfactorily.

In some cases the internal form of anthrax was produced, but in the majority the external or carbuncular form was most common. The guinea pig died anywhere from forty-eight to seventy-two hours after being bitten by the flies.

The transmission of the disease seemed to be mechanical, the anthrax bacillus being carried from the infected host to the susceptible animal on the soiled proboscis of the fly.

A few experiments were conducted in which a period of time elapsed between the feeding on the infected host and the susceptible animal. The results were negative.

In another experiment an infected sheep was used as the source of infection. The same technique was used as in the preceding experiment. Each cage contained about one hundred and fifty horn flies. The flies were allowed to feed for one-half minute upon the abdominal surface of the sheep, after which the screen was disinfected with a 1-1000 solution of bichloride of mercury. Immediately the flies were permitted to feed upon the body of a healthy guinea pig. The results are given in Table II below :

TABLE II.

ANTHRAX TRANSMISSION BY HORN FLY FROM SHEEP TO GUINEA PIG.

Length of Time from Death of Infected Animal.	Number of Guinea Pigs Bitten by Flies.	Number Dying with Anthrax.	Percentage of Infected.
Thirty minutes before death	2	1	50
Fifteen minutes before death	2	2	100
At death	3	3	100
Fifteen minutes after death	2	2	100

The table shows that eight out of nine pigs died of anthrax. No doubt the high percentage of infection was due to the large number of anthrax bacilli being present in the peripheral blood of the sheep.

EXPERIMENT WITH HORSEFLY.

The horsefly, *Tabanus sp.*, was collected, during the middle of the day, from horses and cows in the fields just north of Baton Rouge. The fly appeared in great numbers during the latter part of August and through the month of September, 1915. This species was used because the flies were collected with little difficulty, and while in captivity bit like fiends when placed on any living animal. The host gave evidence of great pain when the fly was feeding, and quite often a drop of blood would escape after the fly had finished feeding.

TABLE III.

ANTHRAX TRANSMISSION BY THE HORSEFLY.

Length of Time from Death of Infected Animal.	Number of Guinea Pigs Bitten by Flies.	Number Dying with Anthrax.	Percentage of Infection.
Four hours before death	6	1	16
Three hours before death	6	1	16
Two hours before death	5	1	20
One hour and thirty minutes before death	6	2	33
One hour before death	8	3	37
Fifty minutes before death	5	3	60
Forty minutes before death	6	3	50
Thirty minutes before death	5	3	60
Twenty minutes before death	5	4	80
Ten minutes before death	6	5	83
At death	6	6	100
Five minutes after death	6	1	16
Twenty minutes after death	8	0	00

METHOD.—Small glass jars, with wire gauze covering, were used as retainers for the flies. One fly was placed in each jar. Several guinea pigs, including the infected one, were secured on small tables with the abdominal surface up. The screen covering the jar was placed against the abdominal surface of an infected pig in the last stages of the disease. Just as soon as the fly commenced feeding the jar was removed and placed upon a healthy guinea pig, where the feeding was completed.

If the screen covering of the jar came in contact with blood from the infected animal the metal cap was removed and replaced with a clean one before feeding upon the healthy animal. This was done to avoid inoculation through skin lesions. The above table No. III. gives the results of these experiments.

The above table shows a rather high percentage of infections produced by the method of interrupted feeding. The carbuncular form of anthrax was produced in the majority of cases. The flies would not feed satisfactorily on the carcass of a guinea pig.

Under field conditions another species, a black horsefly, *Tabanus atratus* Fab., sometimes feeds upon carcasses thirty minutes or more after death. Virulent cultures of anthrax have been obtained from the bodies of these flies which had been feeding upon the carcass of ad animal that had died of anthrax. These flies could not be inducen to feed in captivity, although a great number were collected and different technique used.

It is quite common during the fly season to see blood dropping from the bellies of horses and mules, due to the biting of different flies of the genus Tabanus. In this manner anthrax could be spread from animals suffering with the disease.

EXPERIMENTS WITH MOSQUITOES.

The mosquitoes used in this work were collected near Baton Rouge. *Psorophora* (*janthinosoma*) *sayi* D. & K. were found in great numbers in the low-wooded lands along the Mississippi River. They did not like to come into the hot sunshine, but were easily captured on the body of a horse driven into the woods. The animal showed evidence of great pain by their bites. Individuals of this species were easily recognised on account of the bobbing of their third pair of legs through the air while feeding.

The other species of mosquito, *Aedes sylvestris*, Theob, was very common in Baton Rouge during the summer of 1915, and could be collected while feeding upon man or animal. They bit voraciously, and were very annoying to live stock, even the thick skin of a cow could be punctured with apparent ease.

METHOD.—The same technique was used as with the horsefly. The mosquitoes were retained in the same jars (Fig. 2) and allowed to feed through a fine copper gauze. The interrupted method of feeding was used and from one to five mosquitoes were allowed to feed upon each pig. No difference could be noticed in the number of transmissions by the different species. All results are combined in Table No. IV, below:

TABLE IV.

ANTHRAX TRANSMISSION BY THE MOSQUITO.

Length of Time from Death of Infected Animal.	Number of Guinea Pigs Bitten by Flies.	Number Dying with Anthrax.	Percentage of Infection.
Four hours before death	3	0	00
Three hours thirty minutes before death	3	0	00
Three hours before death	6	1	16
Two hours thirty minutes before death	7	2	28
Two hours before death	7	2	28
One hour thirty minutes before death	8	2	25
One hour before death	10	3	30
Forty minutes before death	5	3	60
Thirty minutes before death	10	5	50
Twenty minutes before death	6	3	50
Ten minutes before death	9	6	66
At death	10	7	70
Ten minutes after death	8	1	12
Thirty minutes after death	6	0	00

The above table shows that the anthrax was transmitted through the biting of mosquitoes for a period of three hours before until ten minutes after the death of the infected host. As with the flies, the greatest number of infections were produced just before or at the time of death of the infected guinea pig. The mosquitoes would feed upon the carcass of a guinea pig for only a few minutes after death. Both the internal and carbuncular forms of anthrax were produced.

EXAMINATION OF INSECT EXCREMENT FOR ANTHRAX BACILLI.

The subject of fecal contamination was also studied in conjunction with the transmission experiments described in this work.

The same bottles were used for retainers for the insects as in the previous experiment (Plate 2). It was necessary to determine the presence of anthrax bacilli in the blood of the infected host before permitting the experimental insect to feed. The following method was adopted:

METHOD.—A mosquito or fly was allowed to feed upon the infected host until engorged with blood, then killed and the blood pressed from the body upon a clean slide. The blood smear was stained in the usual manner and examined under the microscope. If anthrax bacilli were present in large numbers other experimental insects were allowed to feed upon the same area on the infected host. Feeding was a very simple operation while working with the horsefly and mosquitoes, as they would feed about every second day. But it was almost impossible to induce single horn flies to feed while confined in a bottle. This presented a serious problem, because this fly would not live for any length of time unless fed upon the blood of a living animal. To over-

TABLE V.

EXAMINATION OF EXCREMENT FOR ANTHRAX BACILLI.

Name of Insect.	Time Following Feeding on Infected Host—Hours.	Number Specks Cultured.	Number with Anthrax.
Haematobia irritans	0–3	426	6
,, ,, ...	3–6	344	5
,, ,, ...	6–9	230	0
,, ,, ...	9–12	148	0
,, ,, ...	12–15	35	0
,, ,, ...	15–18	25	0
,, ,, ...	18–24	10	0
Tabanus	1–12	54	2
,, ...	12–24	49	0
,, ...	24–48	48	0
,, ...	48–72	40	0
,, ...	72–96	36	0
,, ...	96–120	30	0
,, ...	120–144	24	0
,, ...	144–168	19	0
,, ...	168–192	10	0
,, ...	192–216	8	0
Mosquito	0–24	250	0
,, ...	24–48	211	0
,, ...	48–72	124	1
,, ...	72–96	54	0
,, ...	96–120	36	0
,, ...	120–144	20	0
,, ...	144–192	8	0
,, ...	192–240	8	0

come this difficulty in feeding it was found necessary to place a dozen flies in a bottle, and then all would feed immediately when the screened top was placed in contact with a living animal. After feeding upon an infected guinea pig, the flies were anesthetised and each put into a sterile bottle and permitted to deposit upon the glass of the bottle.

The fresh fecal deposits were cultured each day by removing the "specks" from the surface of the glass by means of a heavy platinum needle, and cultures made in agar dilution plates. After incubation for twenty-four hours at 37·5° C. the cultures were examined, and all colonies resembling anthrax were recultured and inoculations made into guinea pigs. Results obtained are given in Table No. V, above.

The above table shows that one thousand two hundred and eighteen "specks" from the horn fly were cultured and eleven produced colonies of anthrax. These colonies were found within six hours after feeding upon an infected host. Two colonies of anthrax were found in three hundred and eighteen "specks" from the horsefly. One colony of anthrax was found in seven hundred and eleven "specks" examined from the mosquito.

The above results would indicate that anthrax bacilli are mostly if not entirely destroyed in the digestive tracts of the above described insects when ingested from the blood of an animal sick with anthrax. The few colonies found might have been produced from contaminated feet and bodies of the insects.

No attempts were made to feed anthrax spores to see if they would pass through the digestive tract. In this work no micro-organism was considered anthrax unless it proved virulent for a guinea pig. This precaution was taken on account of the prevalence of pseudo-anthrax in this locality, an organism which is found in laboratory cultures and mistaken for anthrax.

Summary and Conclusion.

Briefly the results of the experiments described above may be summed up as follows:

1. Horn fly, *Haematobia irritans*, and the horse fly, *Tabanus sp.*, are capable of transmitting anthrax by feeding upon a healthy animal after biting an infected one.
2. Mosquitoes, *Psorophora* (*janthinosoma*) *sayi* D. & K. and *Aedes sylvestris* Theob. can transmit anthrax in the same manner as flies.
3. The results would indicate that anthrax is not usually spread in the excreta of above insects after feeding upon the blood of an animal sick with anthrax.

In this report on the subject of anthrax transmission by blood-sucking insects common to Louisiana we have given a summary of the work and results obtained. A great many points of scientific importance have not been touched in this work. A large number of insect pests should be investigated to determine the part played by them in the continuance and spread of anthrax in Louisiana.

The results of this work should prove the necessity of protecting animals sick with anthrax against the biting of blood-sucking insects, if the disease is to be controlled. They also show the necessity of keeping valuable animals in screened buildings during the outbreaks of this disease.—*Louisiana Bulletin, No.* 163.

DOCKING AND CASTRATION OF THE YOUNG LAMB.

By J. N. Frost and E. B. Hopper,
New York State Veterinary College at Cornell University, Ithaca, N.Y.

The operation of docking and castrating the young lamb is simple, but unless done with some care may result in loss from hemorrhage or infection. The young lamb is docked and castrated at the age of one or two weeks, both operations being performed at the same time, unless in the case of a very weak lamb, which might be allowed to develop a little longer, or the operations done singly.

In castrating the lamb an assistant holds the animal with a fore and hind leg in each hand with the back against his body. This exposes the field of operation and confines the animal without the danger of injury.

The only instrument necessary is a large pair of shears, and this with a pail of antiseptic solution and a can of disinfecting powder is all that is required. A five per cent. solution of any of the coal tar disinfectants may be used as an antiseptic and equal parts of boric acid, charcoal and lime for a dusting powder.

The shears should be washed in the antiseptic solution before each operation. The operator grasps the scrotum in the left hand and with the shears cuts away at least half of the sac. This produces a sufficiently large opening, so that any pus or blood clot which may form has good drainage. Each testicle is then drawn out separately and the cord severed with shears. The practice of pulling on the testicle and rupturing the cord is not a good one, as this is liable to tear the blood vessels where they branch from the main artery and vein and result in fatal hemorrhage or a large blood clot, which later becomes infected and causes the death of the lamb from sepsis. After removing the testicle the wound is covered with dusting powder which promotes healing and keeps the flies away.

In docking the animal a knife or the horse emasculator may be used. By using the emasculator practically all hemorrhage is done away with, and it also leaves a portion of skin to cover the end of the bone. The lamb is held in the same position as for castration, and after dipping the instrument in the antiseptic solution the tail is removed, leaving a dock one or two inches long. The dusting powder may then be used as in castration.

Following these operations the lambs should be watched carefully and any that show swelling or stiffness should be caught and examined, especially when the animal has been operated upon in fly season, as the wounds are liable to become fly-blown and maggots develop.—*Cornell Veterinarian*

GAS MASKS FOR HORSES.

Poisonous gas, one of the horrors of the war, introduced by the Central Powers, has taken its toll from horses as well as men. A factory in this country is now finishing 5,000 masks a day especially designed for the American horses and mules on the battle front, and it is expected that soon all the transport and artillery animals will be equipped with this life-saving device. Although much of the hauling of supplies and ordnance is effected by motors, it has been found that the horse cannot be dispensed with, and that the motors do not supplant but supplement his work. The dogs used in the service of the Belgian Army are also supplied with masks. It is a matter of profound satisfaction that these useful friends of man can be protected from one of the atrocities of the war.—*Journal of the American Veterinary Medical Association.*

SYMPTOMS AND CONTROL OF STOMACH-WORM DISEASE.

By W. D. Way,

Department of Medicine, New York State Veterinary College at Cornell University, Ithaca, N.Y.

During the late winter and spring just passed, stomach-worm disease has been the cause of considerable loss among sheep owners. In many instances the owner is not aware of any trouble with his sheep until he finds one dead in the fold. This will perhaps be followed by another, and so on, until he really becomes alarmed and begins to watch the flock more closely. Then he notices that some of the sheep seem to lack spirit and vigour. They have a dull, unthrifty appearance and the wool is shredded and pulls out very easily. If he examines the sheep closely, he will find that nothing but skin and bone remain, the emaciation having gone unnoticed because of the wool. The eye is dull, the mucosa of the conjunctiva and mouth are pale, and in some instances white. The animal grows progressively weaker until it can no longer keep its place in the flock, is easily butted about and pushed over by the other animals, and perhaps rises again with difficulty. Concomitant with these symptoms, diarrhœa will be noticed, the fæces being soft, mushy and greenish in color. Finally the sheep dies, and on autopsy the carcass is found extremely emaciated and hide-bound. The subcutaneous tissues are anæmic, the blood is deficient in quantity and in consistency, the parenchymatous organs show degeneration and a paleness from lack of blood supply, the stomach shows redness and the parasite *Hæmonchus contortus* may be found in the abomasum as small white or reddish, hair-like worms 1 to 2 centimetres long. If autopsy is made immediately, a great many of these worms may be found free in the stomach contents and some strongly adherent to the stomach wall. The latter will usually be reddish in colour, due to the ingested blood. However, if the autopsy is delayed, very few or no worms at all may be found it as they disappear from the carcass soon after death.

The diagnosis is best made by killing and making an immediate autopsy on a suspected animal. The fæces of the living animal may be examined microscopically for the presence of ova. These are slightly larger than the esophagastoma, ovoid, and usually show some phase of the process of segmentation.

In order to control an outbreak it is necessary to know something of the nature of the spread of this disease. It has been more prevalent during the past two or three years probably because the seasons have been wet, which are favourable to the development of the ova and the life of the embryos. The disease is found usually in animals pastured on low, marshy ground and in pastures containing stagnant pools. From these places the embryos are ingested by the sheep in the food and water. In the stomach and intestines the embryos develop into the mature, blood-sucking worms. The eggs are laid in the spring and summer by the females and then passed out with the fæces.

Several methods have been tried in an effort to control the disease. A change of pasture each season is desirable, and if it is possible to change two or three times during a season, the results will be still more satisfactory. The choice of pasture is an important factor. The best sheep pasture is a dry, hilly run with good clean running water. If it is possible, an infested flock should be split up into small groups, and their run changed every three or four weeks.

Another method is the so-called "Bare Lot Method," where the sheep are kept on a lot absolutely free from all vegetation and fed in racks and watered in troughs, the embryos thus being starved out.

Infested sheep may be treated with gasoline, ʒ ii in milk for lambs as a drench, and repeated 3 or 4 times. For sheep ℥ ss in ʒ ii of light oil may be given. The principal drawback to this form of treatment is that it may cause congestion of the bowels. Rahe recommends picrate of potash, gr. ii to iii once a day in linseed gruel for three days. Kamala may be used in 4 or 5 gramme doses in water or milk.

In the Ambulatory Clinic we have used copper sulphate solution successfully. This is prepared by placing ʒ ii of copper sulphate in a gallon of water, making a solution of approximately 1.5 %. This is given in the following doses: ℥ mo. lambs, ʒ vi; 6 mo. lambs, ʒ xii; 12 mo. lambs, ℥ xviii; 18 mo. lambs, ʒ xxiv; etc. It is best given as a drench with a metal syringe, using a long nozzle. An attendant holds the sheep, preferably setting it on its haunches as in shearing. By this procedure the head is not held in an unnatural position and there is much less danger of the material going into the lungs. In our experience, holding the head up, with the sheep in the standing position, has resulted in a good deal of choking and coughing, which is not only dangerous to the animal but makes a bad impression on the owner. This form of treatment may be given at any time, but best before the sheep are turned to pasture. In order to get the best results from this treatment food should be withheld for 12 to 24 hours before it is administered. It is well to repeat in two to three weeks, followed by a laxative if desired.

We have used this form of treatment in three flocks and in each the disease has been checked with no more deaths.—*Cornell Veterinarian.*

GERMAN VETERINARY CASUALTIES TO END OF 1917.

THE total number of deaths through wounds, killed and war infections is 139; it comprises 43, or 31 per cent. of officers on active service, and 96, or 69 per cent. of those on leave. The number of wounded is about the same, being 138 (21 of these cases were due to accidents). The percentage in those on active service is 31 and in the rest 69. Fifty-eight per cent. of the wounded received their injuries in the first six months of the war, whilst in the year 1915 the most fatalities occurred. The number of missing is 2, and those taken prisoner 7 (5 of these are counted as wounded).—*Swiss Veterinary Journal.*

Correspondence.

REGISTERED VETERINARY SURGEONS.

Local Government Board,
Whitehall, S.W.1.
August 21st, 1918.

Sir,—I am desired by Mr. Hayes Fisher to inform you that, having regard to the present military and civilian requirements, it has been decided that no registered veterinary surgeon shall be taken for military service except, if he is suitable, as a commissioned officer for employment in his professional capacity, subject to the condition that, if a veterinary surgeon is left in civilian employment, he is engaged on such veterinary work as is deemed to be most in the national interests.

In this respect the position of registered veterinary surgeons is similar to to that of registered medical practictioners and registered dentists, and it is important to secure the best distribution of their services. A Special Tribunal, known as the Veterinary Tribunal, has therefore been appointed for dealing with the cases of veterinary surgeons.

On and after the 28th instant any application, or request for leave to make an application, for the grant, renewal or review of a certificate of exemption to, or held by, a registered veterinary surgeon, on whatever ground, is to be made to the Veterinary Tribunal, of which the address is 10, Red Lion Square, London, W.C.1. and will be dealt with by them. And case which may be pending before a Local Tribunal or an Appeal Tribunal on that date should be referred to the Veterinary Tribunal, with all the accompanying papers.

The powers, functions and procedure of the Veterinary Tribunal in the cases dealt with by them will be the same as those of an Appeal Tribunal when dealing with applications made directly to them.

I am, Sir,
Your obedient Servant.
H. C. MONRO
(Secretary.)

To the Clerk or Secretary of the Tribunal.

SPECIAL TRIBUNAL.

Registered Veterinary Surgeons.

In pursuance of the provisions of regulation 54 of the Military Service Regulations, 1918, the Local Government Board and the Secretary for Scotland hereby appoint—

F. W. Garnett, Esq., C.B.E., M.R.C.V.S.,
G. A. Banham, Esq., F.R.C.V.S.,
Hugh Begg, Esq., F.R.C.V.S.,
C. Charnock Bradley, Esq., M.D., D.Sc., Ch.B., M.R.C.V.S.,
J. Clarkson, Esq., M.R.C.V.S.,
H. J. Dawes, Esq., F.R.C.V.S.,
Sir John M'Fadyean, LL.D., M.B., C.M., B.Sc., M.R.C.V.S.,
W. J. Mulvey, Esq., F.R.C.V.S.,
S. H. Slocock, Esq., F.R.C.V.S.,
J. Willett, Esq., M.R.C.V.S.,
P. Wilson, Esq., M.R.C.V.S.,
W. Woods, Esq., F.R.C.V.S.,

to be a Special Tribunal (hereinafter called the Veterinary Tribunal) for the purpose of dealing, on and after the twenty-eighth day of August, 1918, with any application, or request for leave to make an application, for the grant, renewal, variation or withdrawal of a certificate of exemption to, or held by, any man (not being a duly qualified medical practitioner) who is a qualified veterinary surgeon, registered under the Veterinary Surgeons Act, 1881. F. W. Garnett, Esq., C.B.E., M.R.C.V.S., is hereby appointed to be Chairman of the Veterinary Tribunal.

And the Local Government Board and the Secretary for Scotland direct that the powers, functions and procedure of the Veterinary Tribunal in relation to the matters aforesaid shall be the same as those of an Appeal Tribunal when dealing with applications, or requests for leave to make applications, made direct to them under the Military Service Regulations, 1918, as amended by subsequent Regulations.

Dated this twenty-first day of August, 1918.

W. HAYES FISHER,
President of the Local Government Board.

ROBERT MUNRO,
His Majesty's Secretary for Scotland.

RABIES.

A case of rabies in a dog at Plymouth has been confirmed by the Board of Agriculture and Fisheries. Several other cases that are suspicious have been reported and are now under investigation.

In view of these circumstances and the fact that it is known that in more than one instance persons have been bitten by suspected dogs, the Board have made an Order prohibiting the movement of dogs out of the counties of Devon and Cornwall and requiring the control of dogs within a large area of those two counties.

The public are warned that any case in which symptoms suspicious of rabies are observed the police should at once be notified.

Board of Agriculture and Fisheries,
Whitehall Place, S.W.1.
9th September, 1918.

Personal.

DR. CLEMENT STEPHENSON, D.Sc., F.R.C.V.S., of Sandyford Villa, Newcastle-on-Tyne, has left estate of the value of £58,182, with net personalty £57,440. He gives £5,000 each to the Armstrong College, Newcastle, for building and equipping laboratories, and the Royal Veterinary College, Camden Town, for a scholarship.

F. W. FOREMAN AND G. S. GRAHAM-SMITH, writing in *The Journal of Hygiene* for October, 1917, consider that putrefying bacteria invade dead bodies from the surfaces rather than from the alimentary tract. Carcases of small animals lying on the ground in hot weather were preserved for long periods by the application of creosote oil to the skin and body openings. The stench from dead horses in the war zone was kept down by spraying them with undiluted oil, and brushing the oil into their coats with a stiff brush. Human bodies on "No Man's Land" that had lain exposed for days, weeks, and months, were mummified after one or more sprayings, and the stench completely destroyed. Horse carcases treated with ½ to 1 gallon externally keep well preserved for weeks. Creosote oil sprayed on the inside of mess halls, keeps them free from flies. A piece of cloth saturated with the oil, hung over the entrance to a mess hall, keeps it practically free from flies. G. M.

MR. JACK WILLETT, M.R.C.V.S.,

RECENTLY GAZETTED AN HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING.

THE

VETERINARY JOURNAL

Editor:
FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor:
GLADSTONE MAYALL, M.R.C.V.S.

NOVEMBER, 1918.

Editorials.

SELF-HELP.

Most of us in boyhood's days read a book with the above title by a certain Dr. Smiles. Probably it was dry reading, because pattern conduct is often uninteresting, and virtue's sole reward is frequently an early grave. Nevertheless, the gist of the book is that all progress, material or moral, is due to effort, either collectively or individually, and the lesson is worth remembering to-day. If we as a profession want to rise and take our proper place in the spheres of work developed and developable we must be keen, active and sharp-sighted. By our status in the world and among the professions we must command the respect and regard of the people, and this status, respect and regard will only be won by effort. There will be more criticism and more discernment in regard to the science of work in the future, and we shall have to prove our worth as plainly as the tanks have done. Samuel Turner, in his valuable little book "From War to Work," writes: "I believe until the war came millions of our young men never really knew why they were alive." And again: "The effect on nations as on individuals of periods of stern stress is to stimulate their latent capacities and arouse them from mere idleness and self-indulgence, but above all to endow them with a definite aim, which they have perforce to recognise. And this is, on the whole, probably the greatest gift which can be given to men, rarely as it may be recognised." We must have a conscious aim to preserve and maintain the health of animals, to sharpen our weapons in order to be in a position to do so, to look after our body politic and furnish it with the vitamines to enable it to put forth the maximum of effort and hold its head high up in the ranks of the professions. We want good men and true in our troop, men who will be jealous for the fair name of the profession, who will fight for it and uphold its interests in whichever of its fields they work. Individually we may do much, collectively we can advance our position and entrench ourselves. To our Council we must look for the broadening and safeguarding of many of our rights, privileges and responsibilities. We must not be narrow-minded, badly informed, and ignorant. We have been slackers in the past in many respects, and perhaps no greater stigma can rest on us at present than the state of our library and the little use it is to the profession as a whole. It needs funds in order to flourish. The army of quacks will be strongly reinforced in the few years following the termination of the war. Our Council must be able to take effective action against the poacher and interloper. We have often been ashamed of the stone-age ethics prevailing in our midst. Surely something might be done to raise the standard of the practice of this cult among us. We know that "we are as God made us and often a great deal worse," but dirty actions that will not bear the light of day ought not to be suffered among us, and deserve to be condignly punished.

In our eagerness for work we must not be always at it, else we shall develop into dull dogs. Slackening the bow keeps up its elasticity. "The key to success is to come to a task with a fresh mind." That was the meaning of the very immoral advice given by a don to a friend of mine on the day before an examination. "What would you advise me to read to-night ?" asked my friend, anxious to make the most of the few remaining hours. "If I were you," said the don, "I shouldn't read anything—I should get drunk." He didn't mean that the business was so unimportant that it did not matter what he did. He meant that it was so important that he must forget all about it and come to it fresh from the outside. And he used the most violent illustration he could find to express his meaning. "I think all solemn men ought to take six pennyworth of Charlie Chaplin occasionally." There are well over 3,000 of us on the register. Up to the time of writing we have subscribed a little over £1,000 to the funds of the R.C.V.S. Is it worthy of us ? Can we keep our proper place on this small sum ? Come along, you *non*-subscribers, hurry up, and recollect that there are strenuous times in front of us, and that he who gives quickly gives twice. Surely our Peace-offering should greatly exceed £1,000 odd. G. M.

STOCK.

We make no apology for returning to the subject of our stock of animals. On its welfare and increase our security depends. There is reason to suppose that we shall need all hands on deck to multiply the numbers of our animals in the future. There will be a big demand for all stock in the years to come, and stock breeders, tenders, and keepers will desire increased scope for their work and efforts. In 1917 we had 1,324,000 horses, of which 930,000 were at work on farms in Great Britain. The number of cattle was about 7½ millions. We have 67,000 less milch cows than we had before the war. This, with our army of invalids and hoped for increase in children, is a sad fact. The pity of it is that some previous efficient research and foresight might have avoided it. There were 960,000 fewer sheep in 1917 than 1916. We have about 656,000 fewer pigs than before the war, and Ireland has about 400,000 less. There is plenty of leeway to make up, and let us hope that a look into the future will be taken, and the figures as regards Great Britain at any rate be quickly and materially increased. Contemporaneously with the increase of all stock, there needs to be a full and adequate supply of concentrated feeding stuffs secured. (See article on "Seaweed.") This means an awakening among our scientists and food producers, and the giving of full play and broad vision to experimenters, investigators and research workers. All this involves material help and support to men with brains and energy. G. M.

OUR LADIES' AUXILIARY RELIEF FUND COMMITTEE.

The following, which appeared in the journal of the American Veterinary Medical Association, will be of interest to our readers:—

"In a recent number of the *Veterinary Journal* (London) a very complimentary reference was made to our Ladies' Auxiliary Relief Fund Committee, but the editor expressed himself as not quite clear as to its function, compared to some of the aids the ladies were rendering our British confrères over there.

"As a matter of information to readers of the British journal, it may be stated that after the United States entered the world war, the American Veterinary Medical Association, at its 54th annual meeting, in Kansas City last year, took up a subscription on the spot, which reached a considerable sum, and appointed a relief committee to carry on this work. At the same time the ladies became interested, and in order to do what they could to assist, a ladies' auxiliary committee was appointed to solicit subscriptions from the wives, daughters and sisters of not only the male members of the association, but of those of the profession generally throughout the country. So that the ladies' committee is, as the name implies, an aid, and a very important one, to the main committee in raising funds for the purpose for which it was organised.

"It may also be of interest to state that at the recent annual meeting of the A.V.M.A. at Philadelphia, the treasurer of the relief fund reported a total in hand of over $5,000, the fund now to be known as the Liautard Relief Fund, as a tribute to the memory of the late Dr. A. Liautard, who, we understand, originated the fund on the Continent; and also that the sum of $2,500 was voted by the association to be sent at once to the President, in France, of the Anglo-Franco-Belge Veterinary Relief Fund to help our suffering confrères in Europe, the amount to be presented by the ranking officer of the United States Army Veterinary Service in France at the time. We feel sure that the ladies of our auxiliary will sincerely appreciate the fact that the *Veterinary Journal* has been pleased to compliment them on their beneficent work."

Original Communications.

OBSTRUCTED BREATHING DUE TO A CYST.

By Lieut.-Colonel J. R. HODGKINS, D.S.O.,
Army Veterinary Corps.

History.—The subject of this note, a bay mare of the heavy draught type, aged eight years, was sent into hospital for a swelling in the throat.

On examination the swelling proved to be a painless, tumour-like growth, situated inferiorly to the larynx, and causing the trachea to bulge forward for about nine inches of its length.

Its actual contour was masked and impossible to manipulate, because the growth was immured anteriorly by the trachea, laterally by the mastoido-humeralis muscles, and posteriorly by the cervical vertebræ.

A report was called for as to whether the "growth" interfered with breathing on exercise. The reply to this was: "Does not make any noise on exercise."

A further report was asked for as to the animal's capabilities in draught. This trial proved that the animal was very distressed in draught, went down on her knees, and "made a noise." Diagnosis of any value was out of the question without operation, so this was decided upon.

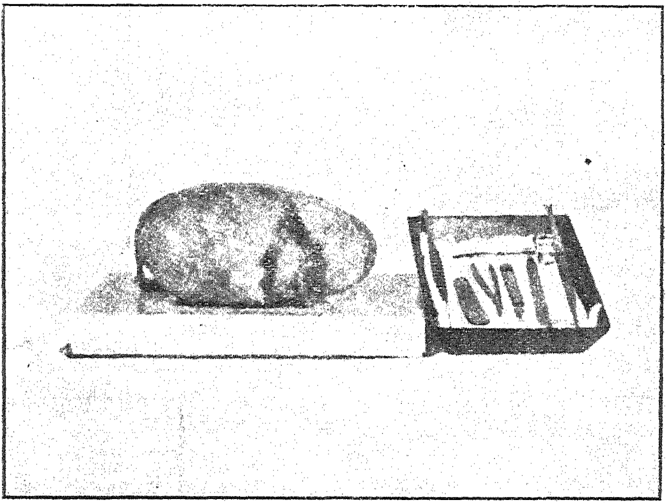
Operation.—The animal, having been previously prepared in the usual manner, was thrown and secured as for the roaring operation. An incision was made through the skin, extending twelve inches along the middle line over the trachea from the laryngeal region. Where this first incision terminated, a second was made at almost right angles to it on the right side of the neck in the direction of the crest.

The large area of skin lying between these two main lines was then laid back, beginning at the junction of the incisions.

This procedure revealed nothing to indicate the nature of the growth. The next step was to secure the integrity of the jugular vein, for it was realised that a serious wounding of this meant obscuration of the field.

Careful removal of the cervical panniculus from the mastoido-humeralis brought the vein into view, but still no information.

On again dissecting carefully, separating the muscles in relation to the trachea, the parting of the sterno-maxillaris and the mastoido-humeralis allowed the operator to place his hand at last on the object sought, snugly tucked away behind the trachea. It was a fluctuating mass, so preparations were made for the evacuation of the contents should the emergency arise. Happily this was unnecessary, for the body lying loosely adherent was easily detached with the fingers, and brought out through the separated muscles.



Description of the Cyst.—It proved to be a cyst, somewhat ovoid in outline, weighing 6 lbs. 2 ounces, length 10¾ inches, breadth 7 inches.

The enclosing membrane was transparent, permitting the liquid content to be seen through the wall.

The accompanying photograph was taken and shows very well the shape, the instruments on the tray giving an excellent impression by comparison of the actual size of the cyst.

I am indebted for the picture to the officer commanding a veterinary hospital in the area.

The photograph having been secured, it was possible to gratify one's curiosity as to the contents of the cyst.

This proved to be a brownish liquid with an olive-green tint, recalling that of bile. There was no odour.

The amount of the liquid was 4½ pints. The internal wall of the cyst was partially covered with a fibrinous deposit, and pieces of organised material without any particular characteristics were floating in the liquid.

After-treatment.—There only remained to secure the surgical wounds after having washed with saline. Healing is proceeding rapidly, the only untoward happening to date being the dying of a small area of the skin forming the angle of the primary incisions.

TWO INTERESTING CASES OF "CHERRY'S OPERATION."

BY MAJOR FREDERICK HOBDAY, F.R.C.V.S.,
Army Veterinary Corps.

CHERRY'S operation consists in the relieving of the tension upon sutures and in drawing together the edges of large wounds by making a parallel slit longitudinally on either side of the original wound. All three wounds then heal simultaneously, and as the two slits are always made in the direction of the hair, the resulting scars are almost (if not quite) invisible when healing has been completed.

It is called "Cherry's Operation" because it was first performed in veterinary surgery by Mr. Cherry, veterinary surgeon at that time to the Life Guards.

The following are two interesting illustrations of its value:—

CASE I.

The patient, a brown mare, 10 years old, was admitted to hospital suffering from indigestion and extreme debility as the result of eating sand and earth, and also from parasitic mange. The skin yielded to treatment in three months, and the animal put on a fair amount of condition, but at this period a large papilloma, six inches by two, made its appearance on the inside of the near thigh, and a second one of about the same size on the outside of the near forearm. These grew very rapidly and ulcerated, forming nasty sores. They were removed three times, either with the knife or the actual cautery, and cauterised on numerous occasions with cupri sulph., all without more than just temporary effect. The one under the thigh was then erased completely under chloroform, a large area of skin around it being taken off at the same time. This finally healed. The one on the forearm was also completely excised, an elliptical incision being made well above and below the tumour, and two slits through the skin, one on either side of the operation wound (parallel to each other, and extending in length for fully eight inches), were made. These relieved the tension of the skin and enabled the edges of the ellipse to be drawn together. All three wounds healed by primary union within ten days, and there was no evidence of any attempt at recurrence when the animal was again seen several months later.

CASE II.

The patient, a horse, had had a nasty injury to the superior maxillary bone, and during the healing process the edges of the skin had curled inwards and adhered to the bone at the border of the wound, so that the wound never became covered over with skin and looked unsightly.

In order to obviate this, the edges of the wound were carefully dissected from the bone and freshened up, parallel incisions were made on either side of it, in order to relieve tension upon the sutures, which were then inserted to draw the edges together. The result was an excellent success, and each of the wounds healed rapidly. After six weeks it was difficult to find trace of the operation.

SEA-WEED.

By G. MAYALL, M.R.C.V.S.,
Bolton.

POETS have sung and novelists and historians written about the harvest of the sea. The view of the harvest has as a rule been limited to fish, crabs, lobsters, molluscs and sponges. If the vision of agriculturists had been so curtailed we should indeed have been a race of meat-eaters, for corn, vegetables and roots would never have seen the light of day. Those who tilled the soil and won cereals, plant and vegetable produce from it would have laughed at those who only saw a source of food supply from the land in the creatures that lived on it. The wild fowl life of the sea and its rock and cliff bound shores have only just been skimmed as a possible source of food supply. The improvement of aquatic and marine birds, their care, collection and concentration has never been thoroughly undertaken to cause a steady flow of likely good material to the market, as in the case of the seal and whale industry. If this side of the life of the sea has only been indifferently explored and investigated, what may be said about its plant and vegetable life? Here a field for likely productive research appears to have been almost wholly neglected. Those living near the sea can testify to the fondness of animals for marine plant life. No distinguished scientist, however, seems to have gone deeply into the matter or considered it worth much investigation. Years ago Whitla observed that pigs in the North of Ireland had been fatted on seaweed and sold profitably in the market. This fact contradicted the theory of those who considered that bladder sea-weed, wrack, tang or tangle was a good remedy for obesity. We ourselves have seen a horse eating bladder seaweed and enjoying it. He had done this for five years and grown fat on it. In a letter received from Lord Leverhulme, who has recently purchased the Island of Lewis, the following occurs :—" When I was in Lewis I was much interested to note that certain seaweed was thrown upon the coast, there called ' tangle,' which is greedily devoured by the cattle, who will gorge themselves with it to repletion, in consequence of which they have to be driven off the shore or many would eat too much of this tangle." Here, then, is sufficient evidence that animals, in one respect, have more initiative than men in taking advantage of what the sea provides in abundance, and here, is enough testimony in favour of some scientific work being done with seaweed as a source of animal food supply. In the VETERINARY JOURNAL for February, 1918, at page 43, reference is made to measures the French Government is taking with regard to sea-weed, and again at pages 346 and 347, in the September issue, there is a further communication on " Seaweed as Food for Horses." Hence we may arrive at the conclusion that horses, cattle, and pigs will eat seaweed readily, and all the proof goes to show that it is just the seaweed that grows so profusely and in such large quantities—in fact, the common sea-weed that cracks when you walk on it—that animals relish the most. Here we are nearly at the end of the greatest war in history, when animal food supply was never so scarce, and yet nobody has been investigating until quite recently a source of nourishment that not only grows in profusion round our shores, but is literally " chucked " at us daily, and if there is any answer to the question, " What are the wild waves saying ? " we think it has come at last, and that it must be—" For Heaven's sake use the seaweed that we are casting up for you twice daily to feed your animals and give them health and strength."

All evidence goes to show that there is something besides weather-glass and fertilising use in sea-weed, and when one considers what valuable chemicals and by-products are obtainable from it, the elementary way of dealing with it that we have hitherto adopted seems really astounding. We shall be glad to hear from any members of our profession or readers of this article who can throw any further light on seaweed-eating by animals. Mr. Wallis Hoare tells us that in some parts of Ireland the working people eat a preparation of seaweed called "Dillisk," which is considered a delicacy.

The B. of A. and F. leaflet on "The use of Seaweed as Manure" describes two chief varieties of seaweed: (1) *Driftweed or tangle* with a stem and a broad flat frond or lamina, growing below low water mark; and (2) *Wrack* or *bladder wrack* found between tide marks which is the species of the plant we have seen eaten.

LYMPHANGITIS IN ELEPHANTS.

By M. C. GUPTA,

Veterinary Officer to Macgregor & Co., Toungoo, Burma.

THE term "Lymphangitis" is ordinarily used to designate a characteristic type of progressive inflammation, and sometimes suppuration, producing purulent ulcerous lesions on the limbs of elephants. There is an idea that in the general attack of lymphangitis the lymph glands are mainly involved. This is an erroneous conception.

Among ailments affecting the working elephants in the forests of Burma, lymphangitis occupies a very important place. All concerned about the elephants find themselves busy against these serious maladies, which at first furnish a comparatively strong contingent of non-effectives, then a number of chronic hospital cases. The length of treatment and repeated care and attendance which they exact put science and the medical personnel to the test.

The two chief types of lymphangitis actually known are (*a*) benign and (*b*) malignant.

(*a*) *Benign.*—In this form of lymphangitis the joints are not mainly affected, but the glands on the other parts of the body become at first firm and hard, later soft and elastic. Fusion of contiguous glands does not often occur and then tends to remain discrete, even after attaining a large size.

(*d*) *Malignant.*—The malignant form of lymphangitis is the most complicated one. The joints are mostly affected in this variety of the disease, and therefore we may give a synonymous meaning.

Definition.—A disease of the joints of doubtful etiology, but probably the result of infection, characterised by changes in the synovial membranes, cartilage and peri-articular structures, and in some cases by atrophic and hypertrophic changes in the bones. A tendency to a chronic course is the rule.

The disease is not intimately associated with rheumatism. By the studies of it we are gradually getting a more accurate knowledge of its anatomical and clinical forms. The synovial membranes and the peri-articular tissues (rheumatoid arthritis) are sometimes less affected than the cartilage and bone (osteo arthritis).

ETIOLOGY.

(1) *Age.*—A majority of the cases are in young animals between the ages of thirty and fifty, and the cases are characterised by special cartilaginous and bony changes.

(2) *Sex.*—So far the cases are in equal proportion between males and females.

(3) *Predisposition.*—Unusual exposure to cold, wet and damp, errors in diet, especially at the beginning of the rains, when the animals gorge themselves on some palatable fodder—such as the new grass coming up at the beginning of the rains—and local injuries through fetters are all spoken of as possible exciting causes, but probably play but a small part. The disease occurs both in winter and summer, and in elephants that are well-conditioned and cared for, as well as among debilitated animals and those suffering from parasitic skin diseases and a condition of ill-health. In the majority of cases it is a result of some infectious process.

Morbid Anatomy (in both benign and malignant forms).—In *benign* form on section, the gland presents a grayish white semi-translucent appearance, broken by intersecting strands of fibrous tissue; there is no caseation or necrosis unless it develops into the malignant variety by a secondary infection. In this form of benign lymphangitis, microscopical examination from the exudation of pus in a few cases revealed not exactly the bacillus of Preisz-Nocard, which is an organism simulating the diphtheria bacillus, but a somewhat similar one.

In the *malignant* form the usual description is that of the late stages of disease when extensive damage has occurred, for there have been few opportunities to study the early changes. There are two main forms of change: (1) Lesions with atrophic changes in the cartilage and bones predominating, (2) with hypertrophy and overgrowth of bone (so-called osteo-arthritis). These two are seen most frequently in the joints of the extremities; whether they are distinct diseases or different manifestations of the same disease it is difficult to say. In many cases all forms of change are found, which speaks against the view that there are two distinct diseases. The changes in general are: (1) Effusion, which is not constant and shows no special features. (2) Changes in the synovial membrane. These are inflammatory. (3) The capsule and the surrounding tissues may be infiltrated and much swollen. The peri-articular tissues show infiltration, and the enlargement of the joint is more often due to swelling about it than to bony changes. (4) Cartilage: this may show erosion, ulceration, atrophy or proliferation. The cartilage may disappear entirely, but the changes are often very irregular and uneven, and the cartilage may be replaced by fibrous tissue or by bone, the latter being most common at the edge of the cartilage. The cartilages may be soft and gradually absorbed or thinned. (5) Bone: this may show atrophy of varying grade. If the cartilage is completely absorbed, the surface of the bone often becomes hard and eburnated. In the form spoken of as hypertrophic there is new bone formation, which is most common at the edge of the articular surfaces. In the knee-joint this may form an irregular ring of bone about the joint cavity. The commonest example of overgrowth bone is seen on the affected joint. There may be deposit of new bone in the ligaments—proliferation of bone usually occurs at the margins of the joints, in the form of irregular nodules—the osteophytes—which may lock

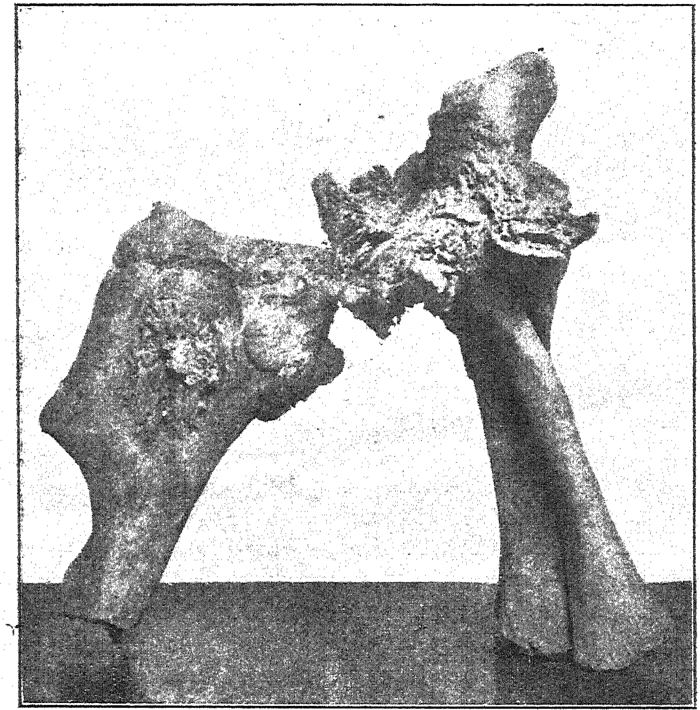


Illustration of Proliferations of both tibia and fibula with bony aukylosis of the knee-joint of Tusker "Pebume"; the animal had to be shot.

the joints. The formation of bone may also occur in ligaments. Bony ankylosis rarely occurs in the peripheral joints. There may be extensive secondary changes. Muscular atrophy is common and may appear with great rapidity. Contractures may follow and the joints become fixed in a flexed position. The occurrence of various changes in the joint is common, and bony change may occur with marked involvement of the peri-articular tissues.

Arthritis Deformans is a chronic infection. By studying the *malignant* cases this view has been gaining ground, although as yet positive bacteriological evidence is lacking. The infection may be with a specific organism, or perhaps with various ones. A few organisms have been obtained from the joints, but no facility was available for the injection of cultures into experimental animals. It, however, seems probable that this form of arthritis may be secondary to infection with various organisms. The infective theory of origin is gaining adherence. *Symptoms.*—In *benign* form the inflammation of the lymph vessels begins frequently on the limb, but is also commonly observed on the sides of the chest walls and abdomen, where it usually develops from a small wound or a slightly negligible fresh scar. Such wounds refuse to heal and sometimes gradually form ulcers with red, luxuriant granulation, or the resulting cicatri are transformed into a firm, painless node, which may first attain the size of a small ball, but gradually becomes as large as a cocoanut or sometimes bigger than this. The local process is followed by swelling of the regional lymph vessels, which form prominent, wavy and branching, painful strands, in the course of which develop firm tumours from the size of a fist to a large cocoanut. If treatment is taken in hand at once, these swellings sometimes become soft and pus forms, which requires opening, and evacuation of a large quantity of grayish white, semi-translucent matter escapes. In such cases the operating wounds heal up quickly under an antiseptic plan of treatment, whereas in the *malignant* variety the onset may be acute or gradual; with the chronic attack the duration is usually prolonged. The acute onset occurs more frequently in the form in which changes in the soft parts predominate.

Arthritis.—In the acute form the joints are swollen, tender and hot to the touch. There may be effusion in the affected joint. Pain is a marked feature, and is increased by movement, the patient usually taking the position in which he has the greatest ease. When a joint is once attacked, the process does not subside quickly, and when the arthritis lessens some change remains in the joint, which, however, may be very slight. The carpal elbow and knee-joints are often involved, with pain, effusion, limitation of motion, and later villous arthritis or sub-luxation. Thickening of the capsule usually occurs early. With the hypertrophic form there is often bony proliferation.

General Features.—Temperature: No perceptible elevation of temperature in elephants has so far been observed. It is rather lower. The blood often shows a slight anæmia, which is not as marked as might be expected from the appearance of the patients. The urine does not show any change of moment. Muscular atrophy is common, and sometimes advances very rapidly. In some cases the bony atrophy is very marked. Two illustrations herewith enclosed are interesting.

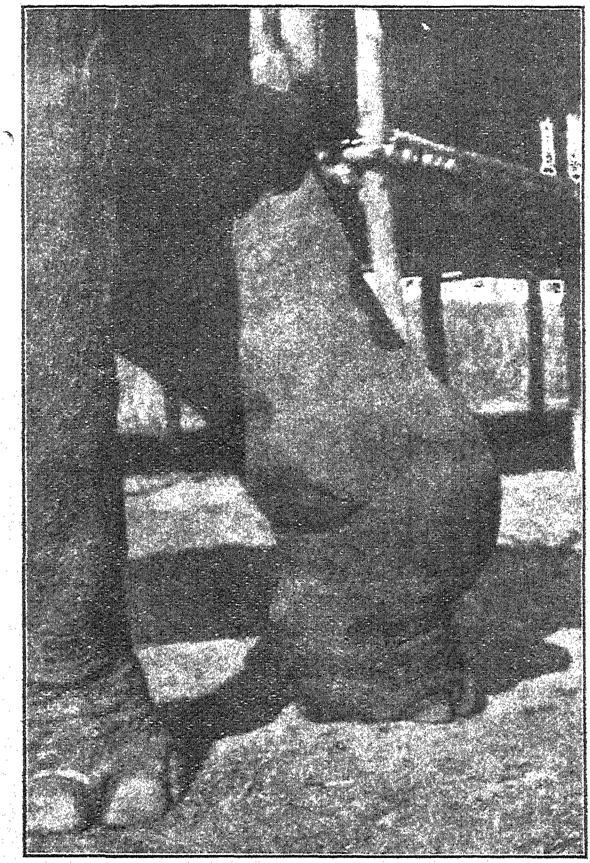


Illustration of Swelling of the Wrist-joint of Elephant, "Moloko." He is a patient in the hospital at present.

Course.—General Progressive Form: This occurs in two varieties, acute and chronic. There is involvement of a joint or joints ; swelling, particularly of the synovial sheaths and bursae. The general nutrition usually remains good, though in malignant cases the animal may become emaciated. Some cases progress very rapidly ; they lose weight and strength, atrophy and arthritic deformity are marked ; and they suggest a progressive septic process without showing any exernal signs of suppuration in any of the affected joints.

The chronic form is the most common, although most of these have had at some time an acute attack, and especially at the onset. The first symptoms are pain on movement and swelling, which may be in the joint itself or peri-articular sheaths. In some cases the effusion is marked, in others slight. Pain is an extremely variable symptom. Some cases proceed to the most extreme deformity without severe pain ; in others the suffering is very great. Pain has an important influence in the production of deformity, as it hinders movement, and the joints are kept in the position of greatest ease.

Gradually the shape of the joint is greatly altered, partly by the thickening of the capsule and surrounding tissues, perhaps by the pressure of osteophytes, and often by the muscular contraction. Ultimately the joints become completely immobile, not by a true bony ankylosis, although it may be by the osteophytes which form around the articular surfaces like ringbone in the horse, but more often from adhesions, and peri-articular thickening. A majority of the cases finally reach a quiescent stage, in which they are free from pain, but suffer from crippling necessarily associated with the disease. A few cases also showed cardiac lesions.

Diagnosis.—The presence of swellings either at the joints or any other parts of the body, thickening in a joint, rapid muscular atrophy, pain on movement, temperature moderate—these are prominent signs and symptoms of the disease. The absence of marked response to salicylate medication speaks against rheumatism.

Prognosis.—In benign form the prognosis is generally favourable if the diagnosis is made at the early stage, whereas in the malignant cases the age, general circumstances and the extent of damage to the joints and the variety of change are all important. Rapid muscular atrophy is of great importance. Rapid advancement in the joint changes is serious.

Treatment.—Much depends on the proper management, and pessimistic attitude is not justified. Certain things are important ; early diagnosis, careful attention to the general condition, and every effort to limit the damage to the joints. The bowels should always be kept open, and for this the salines are useful.

Medicinal.—There is no drug which essentially influences the disease. The salicylate may be an aid in relieving pain, but should not be given for long periods. Iron, arsenic and iodine are sometimes beneficial. Atoxyl sodium gave some very good results, but a permanent cure by any such drugs is the exception, not the rule.

CONCLUSION.

My main object in writing this Note is to direct the attention of the veterinary profession, both in India and elsewhere, to this disease, in order that it may be further investigated.

I have compiled a series of cases for the last five years. The cases of benign form of lymphangitis are too numerous to put them down in a tabular form. Fortunately this form of lymphangitis easily yields to treatment. So far only one case has a permanent disfigurement in her abdomen — a tumour as big as a cocoanut, at the centre of the abdomen.

Of malignant cases, for the last five years there have been 32 selected patients, out of which 15 died; that is to say, the casualty is about 43 per cent.

Lastly, the pathological condition and etiology of this disease that is met with fairly frequently amongst the working elephants in Burma are not identical with the case of lymphangitis in horses, as recently published in THE VETERINARY JOURNAL. The bacillus isolated in the benign form of lymphangitis in the elephant is not similar to that of the bacillus of Preisz-Nocard Everything which is related here is based upon my own conviction and observation, and is therefore subject to correction

References :

(1) *Veterinary Journal.*
(2) "Special Pathology," by Hutyra and Marcl·
(3) Osler's "Practice of Medicine"

INTERESTING CASES.

BY G. MAYALL, M.R.C.V.S.,
Bolton.

IMPACTION OF THE COLON IN THE HORSE.

IN the July number of the *Veterinary Journal*, at page 247, there is a short but very valuable Note by Mr. W. Lothian, M.R.C.V.S., of Duns, on the uses of sodium sulph. exsiccat. in the treatment of colic. He recommends it (as a substitute for linseed oil) in six-ounce doses dissolved in a quart of warm water.

On August 15th we were called to attend a valuable seven-year-old bay carthorse showing the following symptoms: Moving about uneasily in the stall, pawing with his forefeet, crouching, lying down stretching out, getting up on his feet after a time, short intervals of quiet, and then repeating the performance. No dung passed for twelve hours. The usual wretched stuff which does duty as chop at the present day had been given as food. The impacted colon could be felt on palpitation per rectum. A stock colic drink of aloes and ammon. carb. had been given previous to our arrival. We gave the horse six ounces of sodium sulphate in a quart of warm water, and also an enema of warm water and soap. During the night he was restless, but in the morning showed some improvement, having passed some dung and remained quiet for longer intervals. We gave another rectal injection, and, as the pulse was good and the horse not in much pain, left him, telling the horse-keeper to report on his condition in the evening. The report was good, the horse being quieter and having passed three or four lots of dung. This horse now made a good recovery, and his appetite and condition have improved since the attack. A second case of the same nature in a black vanner terminated just as favourably under similar treatment. Here only four ounces of sodium sulph. exsiccat. were given in a whisky bottleful of warm water. Icteric membranes, pasty mouths, and fœtid breath soon disappear under the sodium sulphate treatment. Personally I wish to record my gratitude to Mr. Lothian, and hope others who read his Note and these lines will record their experiences.

BLOODY MILK.

THE rupture of blood vessels occurs inside the udder as the result of kicks, blows, and treads. The danger of internal injury would seem to be greater when the udder is distended with milk than otherwise. Probably this is the most frequent cause of blood in the milk in cows; but it is certain that a similar condition arises in heifers, due to the first functioning of the udder, and when bucket feeding the calves and hand milking is the practice. It may arise from rough milking; but sometimes we think there is transudation of blood through the blood vessel walls as a result of congestion of the udder.

The two following cases are interesting:—

Case I.—A cross-bred heifer calved three weeks with first calf. Calf taken away and bucket fed; heifer hand-milked. Blood was diffusely spread in the milk, and on standing the fluid in a glass a thick deep red layer was seen at the bottom. The heifer gave bloody milk from all the four quarters of the udder, rendering it quite unfit for human use. The farmer consulted me, and I prescribed drachm doses of liquor ferri perchlor in a pint of linseed tea twice daily, and the cow to be put on spare cooling diet. On the third day the character of the milk had improved, but it was still mixed with a fair amount of blood. The liquor ferri perchlor was increased to two drachm doses in linseed tea, and on the seventh day blood ceased to appear in the milk, and the heifer has gone on quite all right since.

Case II.—A Welsh heifer dropped her first calf in April of this year. At the end of July blood appeared in the milk, and was chiefly observed in the last drawn milk. The blood appeared first in the fluid drawn from the front quarters of the udder, and then in that from the back quarters, and changed continually from one quarter to another. One drachm doses of liquor ferri perchlor were prescribed to be given twice daily in linseed tea. After seven days' treatment on these lines the milk became normal, and has remained so since. A curious feature in this case was that about three weeks after the commencement of treatment the milker felt something hard in one of the teats, and two clots of blood the size of saccharine tablets came through, but there was no subsequent hæmorrhage. In checking hæmorrhage externally by drugs we have found nothing to beat liquor ferri perchlor; in fact we consider it the only reliable styptic, and we have been let down by several others that are classed as such.

CLINICAL CASES.

By J. H. PARKER, M.R.C.V.S.,
Faringdon.

FATAL DUAL OPERATION.

The shire stallion Secundus Imin was bred by a tenant farmer, and sold as a two-year-old to a tenant farmer for 1,275 guineas—both records for tenant farmers—at the last London Shire Horse Show. Shortly after purchase it was found he made a noise, and he was sent to be sold for what he would make, last spring, at Peterborough. Whilst there, he developed influenza and prolapsus of the penis, and could not be exposed for sale. He was under the care of Mr. Lockwood for about three weeks, and was then sent home. I found him recovered from the influenza, but his penis was prolapsed and paralysed with a hard swelling about the middle third, which had evidently been scarified, as it was bare. We suspended the penis in a bandage and sheet, applied fomentations, lotions, massage, etc., with no result. Some one advised the owner to turn him out for a couple of months, with no result. I then received the order to operate on him on the kill-or-cure principle, as he was no use as he was, and there were a lot of lady farmers on the estate. On the 24th of June we put him down and chloroformed him deeply. I tied a wax end ligature round the penis and inserted a catheter. The penis was severed by means of several sharp hot irons until we reached the catheter, the remaining part being severed with a scalpel. We castrated him at the same time with the actual cautery. After going about half way through the penis, the ligature slipped into the fissure and he bled freely for a bit. By means of several interrupted sutures we darned up the end of the penis and the bleeding stopped. We suspended the free end of the catheter under the abdomen with tapes. On June 24th the scrotum and sheath were undeniably swelling; on the 26th the swelling areas extending along the abdomen. He had a temperature of 106. Appetite gone. He died on the 27th. On cutting into the extirpated part of the penis, I found a cyst where the original swelling was, full of what looked like dried pulverised blood. I don't think the influenza was the cause of this, as the horse was in the habit of kicking at his penis when in a state of erection, and I think a blow caused the cyst. I wanted to keep it as a specimen, and after disinfecting it hung it up to dry, but the last I saw of it was disappearing down the neck of my foxhound puppy, disinfectant and all.

A PHARYNGEAL TUMOUR.

Subject.—A $2\frac{1}{2}$ years old polled Angus bullock was making a snoring noise during respiration, with puffing of the cheeks at each expiration.

Diagnosis.—Pharyngeal abscess. Cast him and found swelling in pharynx about the size of a hen's egg. Pinched it off with my fingers, but little matter escaped. Breathing better for a week, when he snored as much as ever. Put him down again and found it had turned into a hard tumour, which I split in two with a hooked-knife, but he did not improve and was sent to the butcher.

INTESTINAL CALCULI.

Subject.—A 10 years old light van mare, bought by a farmer at a London horse repository; previous history unknown. After being in the country about a month, had an attack of colic. I found her with an anxious look on her face. Pulse and temperature normal. Typanitic, and occasionally showing and persistently working the rectum. She had been served by the horse the day before, and they thought he had hurt her. She kept on like this for seven days and died. A *post-mortem* showed four large calculi in the floating colon. Dark smooth stones on section, and warted externally like an orange skin with mucus and dried ingesta.

FŒTAL DYTOKIA: A PUZZLING PRESENTATION.

Called at 5 a.m. on a cold frosty morning last February to attend a heifer for her first calf. Anticipating difficulty in starting the car, rode an ordinary bike four miles, and was nearly frozen. On arrival, found a small heifer presenting a calf's nose and what I thought were two fore feet. Room very limited and could not explore. Roped both forelegs at the pastern and tried to pull them forward without any result, although we used pulleys. After about an hour, I got the calf's head out and amputated it at the atloaxoid joint. I then found that we had been pulling at the left fore leg, and what I thought was the right foreleg was the foot of the off hind leg, and the right foreleg was doubled back from the shoulder and the right hind leg had taken its place. I have been at this game for 25 years and was never puzzled so much before. After getting the right foreleg forward, delivery was comparatively easy.

A VENEREAL WART.

ABOUT 12 months ago was asked to see a valuable two years old Friesian bull, which was supposed to have caught cold and would not serve his wives. Could find nothing wrong, but on showing him a cow in distress, could see he had a small wart on the tip of the penis. Tried to secure penis with a looped tape, but could not. Owner was anxious to use him, so we put him down and choloroformed him, but could not get the penis out of the sheath. Let him go for a week, then showed him another cow, and was then able to get looped tape on penis above the wart. Cast him and removed wart with force. In about a fortnight he bulled his cows again all right (and got them in calf). In about two months the wart came up again and the same process was repeated, with the same effect. After removing it three times with the wart forceps, I thought I would try the actual cautery the fourth time. We cast him by the Russian method (rope round body), and when I had got about half through the wart the bull struggled, and the man in charge of the rope let go. The bull jumped up and went full tilt round the yard; in doing so he put his foot in the looped tape and tore the wart off. There was a fair amount of bleeding, but we could do nothing more. I saw the bull yesterday, when he tried to bull a cow, and when he pulled the tape off, he pulled a bit of the end of the penis off containing the roots of the wart. Except being a bit shorter and having a peculiar look, I think it will be all right and that he will still be useful as a bull.

General Article.

THE MEAT-INSPECTION SERVICE OF THE UNITED STATES DEPARTMENT OF AGRICULTURE.*

By GEORGE DITEWIG,
Meat Inspection Division, Bureau of Animal Industry.

THE purpose of the meat-inspection service of the United States Department of Agriculture is to eliminate diseased or otherwise bad meat from the general food supply; to see that the preparations of the meats and products passed for human consumption are cleanly; to guard against the use of harmful dyes, preservatives, chemicals, or other deleterious ingredients; and to prevent the use of false or misleading names or statements on labels. In short, to protect the rights and health of the consumers of meat and meat food products to the fullest extent possible under the laws. The service is administered through the Bureau of Animal Industry of the department.

MEAT-INSPECTION LAWS AND REGULATIONS.

Federal inspection is maintained under the Meat Inspection Act of June 30, 1906, and supplementary legislation in the Tariff Act of October 3, 1913. Space will not permit giving an outline of the different provisions of the Act of June 30, 1906; however, it is essential to an understanding of the scope of the service that the reader know that the food animals to which the law refers are cattle, sheep, swine, and goats, and that the slaughtering, packing, rendering, and meat-preparing establishments to which it applies are those which sell or ship their products in whole or in part in inter-state or foreign commerce, and that it does not apply to those establishments the meats and products of which are neither sold nor shipped outside the confines of the State in which the plant is operated. Further, the Act grants a qualified exemption from inspection to retail dealers supplying their customers, and also provides a similar exemption for the meat from farm-slaughtered animals. The tariff legislation referred to provides inspection for imported meats and products.

The meat-inspection regulations of the department for governing the service are clear and comprehensive, and embody the recommendations of scientists and hygienists outside the department as well as the judgment and experience of administrative officials and workers in the service as to what constitutes an efficient system of inspection and how best to attain the objects of the law. Copies of the regulations may be had free upon application to the Bureau of Animal Industry.

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* U.S.A. Department of Agriculture, Bulletin 714.

SANITATION.

The requirements as to sanitation in the establishments that operate under inspection occupy an important place in the meat-inspection regulations. Prior to 1906 the Secretary of Agriculture was without authority to fix and enforce such requirements, but when it was conferred by the Meat Inspection Act of that year the department proceeded to enforce sanitation in all establishments operated under Federal inspection. The first step taken was to require strict cleanliness as regards the rooms and equipment and in respect to the conduct of operations and the handling of products, and the second was to adopt rules governing plant and equipment construction.

The first part of the programme, that is, strict cleanliness, was soon attained in the plants of good construction, and in as full a measure as could rightly be expected in those of the type of construction common to that period. As regards the second, it was apparent from the beginning that conformity with a certain type of construction must be had if good sanitary conditions were to be readily and surely maintained throughout the plants. Accordingly it was endeavoured to attain this quality in all plants by leading to the use of non-absorbent materials instead of the absorbent ones which had been so freely used in previous construction; to replace rough and pervious surfaces with smooth and impervious ones; to supplant artificial light with abundant natural light; to replace odour-laden air with fresh air wherever possible; to eliminate incomplete and defective systems of drainage and plumbing and to install such as are modern and effective; to require that sanitary and adequate dressing-rooms, toilets, and lavatories be installed; to subject the water supply to the test of laboratory analysis to ensure its purity; and to require a separation of the rooms and equipment used for edible products from those used for inedible materials. These improvements indicate the rules adopted by the department to mark the reform in plant and equipment construction. It is believed that the progress made has been excellent.

THE ANTE-MORTEM INSPECTION.

Under the Federal system not less than two examinations are made of the animals slaughtered in official establishments. The first is the ante-mortem inspection or examination of the live animal, the second the post-mortem inspection or examination of the carcass and the various organs and parts at the time of slaughter. The post-mortem is the more valuable of the two inspections, but both are necessary if it is to be determined with certainty in every instance that the flesh of the animal is sound, wholesome, and fit for human food.

The ante-mortem inspection is performed in the pens and alleys of the official establishments, except that at most of the large slaughtering centres it is found more convenient to conduct it in the public stockyards. The animals are carefully observed for evidence of disease or abnormal condition while at rest in the pens or as they move from the scales after weighing. If any of a lot show symptoms, then the entire lot is subjected to further and individual inspection. If the animals are swine and the symptoms indicate cholera, they are driven to a special pen for further examination, and in certain cases to ascertain their temperatures and to make a record of the same. Other diseases or conditions in which the question of temperature is important are Texas fever, anthrax, blackleg, pneumonia, septicemia, and severe injuries. When a high temperature exists, and there is doubt as to its cause, the affected an imalis marked and may be held for observation and retaking of temperature.

When its appearance is such as to lead the inspector to suspect that an animal is affected with a disease or condition that may cause its condemnation in whole or in part on the post-mortem inspection, it is marked for identification by means of a serially numbered metal tag bearing the phrase " U. S. Suspect " affixed to the ear. Such an animal is termed a " suspect." A record of the tag number, the inspector's diagnosis, and of the animal's temperature, if that was ascertained, is made and sent to the inspector who is to conduct the post-mortem inspection. This information is given due weight by him in determining the final disposition of the animal. Suspects are kept apart and slaughtered separately from those which were passed on the ante-mortem inspection.

Animals which show symptoms of rabies, tetanus, milk fever, or railroad sickness, and hogs which are plainly sick with hog cholera, are condemned on the ante-mortem inspection. Such animals are marked by means of a serially numbered " U. S. Condemned " metal tag affixed to the ear. Animals so tagged may not be taken into the slaughter room, but must be destroyed and disposed of as required for condemned carcasses to prevent their use for food. Animals which are found dead or in a dying condition on the premises of an establishment are condemned and disposed of in the same manner.

THE POST-MORTEM INSPECTION.

Each of the successive examinations, extending from the live animal to the finished meat food product, serves some particular purpose, and has a relative value in a complete system of meat inspection. Omission of certain of the other examinations would result in some, though not vital, impairment of the service as a whole, but the post-mortem inspection is indispensable, because its chief purpose is to detect disease and to eliminate the danger that threatens the consumer on this account. Further proof of its importance lies in the fact that aside from certain exceptional conditions it is not possible for even an expert to recognise or prove the presence of disease or the effects of disease by an examination of the meat alone after it has been cut from the carcass, but he can do so through a proper examination of the whole carcass together with the organs. Before entering upon a description of the post-mortem inspection procedures the meaning of the word " disease " as it is used in meat inspection should receive some explanation.

MEANING OF " DISEASE " IN MEAT.

The meaning of the term " disease " as used in meat inspection does not differ materially from the meaning given it in medical literature, and never in meat inspection is the seriousness of disease underestimated. There is, however, much popular misconception in regard to the nature of the different conditions to which the term is applied in discussing meat inspection. The common or popular error on this point arises from the broad assumption that every condition to which the term disease is applied is noxious and harmful to such a degree as to make unsafe or unfit for food all the flesh of an animal in which any of these conditions is found. The facts of pathology plainly refute such assumption. By using the microscope and laboratory tests and by applying the term in its most technical meanings, a pathologist could demonstrate disease or evidence of disease in any and every food animal that might be submitted for examination. But no pathologist would hold such demonstration to be proof that the flesh of every such animal is unsafe or unfit for human food.

The error in the popular conception might be more clearly shown by the use of a homely illustration or two : The peach or the pear with a small unsound spot, strictly speaking, is an unsound fruit, but with the spot cut away it may certainly be a sound and delicious article of food. So also with a bunch of grapes, some of which may be in bad condition, while the others may be sweet and wholesome. Similarly, any one of certain diseases may exist in a circumscribed area or part of an animal. A clear illustration of this is the disease commonly called " lumpy jaw " of cattle. In many instances the tumour on the jaw attains a considerable size. Nevertheless, in very many such cases the disease is as distinctly localised as is the unsound spot on the pear, and aside from the affected part the flesh of the animal may be absolutely clean and wholesome. To carry the illustration further, in meat inspection tuberculosis is encountered far more frequently than is any other disease, and great care is exercised to detect its presence in even the minutest degree. In a very considerable proportion of the cases found the lesions are confined to one or to a small number of the visceral lymphatic glands, or they may exist to a slight degree in an organ and in some of the lymph glands. An animal so affected is diseased, and yet in that form of the disease the lesions are so limited in number and so completely localised and hemmed in by encapsulating tissues, built up by the protective forces of the body, that the affected tissues are as distinct from the remainder of the animal economy as are the bad grapes from the good ones. With the bad ones removed the bunch becomes good food, and likewise the meat of this class of tuberculous animals must be regarded as sound and wholesome when the affected parts have been carefully removed.

The foregoing comparisons are used merely to illustrate the point that soundness and unsoundness may exist in the body at the same time in varying proportions, and that as a rule it is possible to separate and treat each portion according to its condition. In short, the point can be made clear by discarding the word " disease " for the moment and saying that the function of a scientific and national meat inpection is to recognise and reject the meat or meat food product which is unsafe or unfit for human food, to pass that which is wholesome and fit, and, when doubt exists as to which of these conditions obtains, to resolve, that doubt in favour of the consumer.

PROCEDURES.

The post-mortem inspection is made at the time of slaughter, and includes a careful examination of the carcass and all its parts. Where the number of animals dressed per hour does not exceed a certain general limit, one inspector, constantly present, performs all the inspections. Where the number of inspections per hour exceeds certain general limits, the inspectors are increased accordingly and the work so arranged and co-ordinated that each inspector gives entire attention to some particular part of it. Thus the work is in a sense specialised and the inspectors become specialists, with the result that a high individual and collective proficiency is attained and efficient inspection assured regardless of the rate of slaughter.

An important requirement in the conduct of this inspection is that the identity of the carcass and of each of its severed parts be carefully maintained until the inspection is completed, so that if there is disease in any one organ or part, all the other parts and the carcass may be brought together for additional and final examination. Facilities for maintaining such identity are provided in the slaughter departments, and every inspector is supplied with serially numbered " U. S. Retained " tags, which he affixes to the carcass and severed parts, and by means of which he retains them for the additional inspection. The different steps of the post-mortem inspection are:—Head inspection, viscera inspection, carcass inspection, final inspection, disposition, and marking.

HEAD INSPECTION.

In cattle heads the different pairs of lymphatic glands are cut into and examined, particularly for tuberculosis. The tongue is examined and, if necessary, cut into. The presence in the flesh of cattle of a certain cyst capable of producing tapeworm in man can usually be determined by examining the inner and outer cheek muscles. Therefore these muscles of cattle are laid open by deep slicing cuts for the detection of this cyst. A careful survey is made of the head as a whole for actinomycosis, deformities, etc. In the heads of swine certain lymphatic glands, which are favourite seats of tuberculosis, are incised in every instance and examined for evidence of that disease.

INSPECTION OF VISCERA.

As the several organs are removed from the carcass they are placed before the inspector, on a table, in pans or other suitable metal receptacles for examination. Facilities for promptly cleansing such equipment in the event of contamination, through the contact of diseased viscera, are at hand. The various organs and parts are carefully viewed and certain of them cut into, while others are subjected to manual as well as visual examination. The entire procedure is methodical, and designed to disclose disease or harmful condition if any exists in the parts under examination.

CARCASS INSPECTION.

This examination embraces a careful viewing of all surfaces and parts of the carcass, with particular attention given to the condition of the serous membranes of thoracic and abdominal cavities. Further, certain parts which more frequently than others are seats of disease, are subjected to a manual as well as a visual examination.

The head, viscera, and carcass examinations together constitute the regular post-mortem inspection. The animals found to be free from disease or any doubtful condition are marked "Inspected and Passed," while those in which any disease or doubtful condition is found are retained for the final inspection.

THE FINAL POST-MORTEM INSPECTION.

The carcasses and parts retained on the regular inspection are sent to the final inspection room or place, where another inspector with special facilities at his command subjects them to a searching examination. This enables the inspectors engaged in the preliminary and regular inspections to continue their examinations of the animals which are before them without delay and without omission of any kind. The establishments in which slaughtering is done are required to provide these rooms or places for the final inspection and to equip them with all the facilities necessary for a ready, cleanly, sanitary, and efficient performance of the work.

Since the animals held for the final inspection are tagged or retained for cause, only veterinary inspectors who have become skilled through training and experience in the work are detailed to make such examinations and to determine the final dispositions. As indicating the detail observed in the conduct of this inspection, it need only be mentioned that a record is made, on appropriate forms, of the results of the examination of every animal showing disease in any degree. In this record the animal is identified by a tag or stamp number; the diagnosis and the nature, location, and extent of the lesions are indicated; and the disposition of the carcasses and the name of the inspector are shown. The final inspection reports for the last fiscal year preceding this writing alone contain a record covering approximately 3,500,000 retained animals.

As soon as the several examinations have been made and the dispositions determined, there remain two important acts, the performance of which completes the post-mortem inspection. They are the marking of each carcass to show plainly to every beholder the disposition made of it and to see that those carcase and parts which are condemned are disposed of as required by the meat-inspection regulations to prevent the sale or use of the same as human food. Each of these procedures will be briefly described.

DISPOSITION OF CONDEMNED CARCASSES, MEATS, AND PRODUCTS.

The Federal meat-inspection regulations governing the disposal of condemned articles emphasise three important requirements, strict observance of which is imposed upon every bureau employee whose duties relate in any way to their enforcement :—First, that every condemned carcass, part of carcass, meat, or product be plainly marked to show that it is condemned, and that parts or products too small or which are of such nature that they cannot be so marked be placed in appropriately marked containers; second, that all condemned articles remain in the custody of an inspector from the time they are condemned until properly disposed of, and that if the articles are not disposed of on the day they are condemned they shall be locked in the "U. S. Condemned" rooms or compartments, the locks of which are selected and supplied by the department and the keys of which remain in the custody of the inspector; and third, that the required destruction or denaturing of the condemned articles shall be done by the establishment in the presence of an inspector, who must render a report covering the transaction. The Meat

Inspection Act specifically provides that the Secretary of Agriculture may withhold inspection from any establishment which fails to destroy for food purposes any condemned carcass or part thereof.

The customary method of treating condemned carcasses and parts is to convert them into grease and fertilisers by rendering them in a steam-pressure tank. The procedure as outlined and practised under the Federal meat-inspection regulations is substantially as follows :—The lower opening of the tank is securely sealed by an inspector with seals supplied by the department for the purpose ; then the condemned articles and a sufficient quantity of denaturing material of a kind approved by the department is placed in the tank in the inspector's presence, after which the upper opening is also sealed, and it remains the duty of the inspector to see that a sufficient force of steam is turned into the tank and maintained a sufficient time effectually to destroy the contents for food purposes. The department seals on the tank may be broken only by an inspector. A small number of the establishments at which Federal meat inspection is maintained do not have steam-pressure tanks in which condemned meats may be denatured in the manner described. At these such meats and products are denatured by the addition of crude carbolic acid or other prescribed denaturing agent, or are destroyed by incineration.

THE PRODUCTS INSPECTION.

Because meat or other edible portion of an animal which was entirely sound and wholesome at the time of slaughter may become unsound or contaminated through improper care or handling, and because healthful products may be made unwholesome through adulteration or the addition of deleterious ingredients, and for the purpose of protecting the purchaser against false or misleading labels, a proper measure of control of the various operations of processing, preparing, and labelling meats and products becomes necessary. Such control is one of the functions of the Federal inspection. In other words, under the Federal system the inspection extends from the live animal in the pen to the product in the labelled package. The bureau employees who conduct the products inspection are designated "lay inspectors," and are selected for their practical knowledge and experience in the handling and preparation of meats and meat food products ; also for their skill in testing and passing on these articles as to soundness and fitness for food.

All the meats and products in official establishments, notwithstanding that they are previously inspected and passed, are reinspected as often as may be necessary to ascertain whether they remain sound and wholesome. The lay inspectors exercise a supervision over all such operations as the processing, curing, packing, marking, labelling and shipping of meats and products. The materials added to products are examined to see that regulations relating to prohibited ingredients are observed and that the requirements as to correctness of labelling are complied with. Samples of the different kinds of products are taken and referred to meat-inspection laboratories for chemical or other technical examination. It is also the duty of the lay inspectors to see that the requirements of the regulations in regard to the cleanly and sanitary handling of products and as to the sanitary conditions of the rooms and equipment are observed.

If, upon reinspection of an article, it is found to have become unfit for food from any cause, the original inspection mark or label thereon is removed or defaced and the article condemned.

THE INSPECTION MARKS, INSCRIPTIONS, ETC.

The mark of inspection is to identify the article and to show the condition of any particular carcass, meat, or product at the time the mark was applied. Under the Federal system, similar to that of the best European systems of meat inspection, three dispositions of a carcass are possible on the post-mortem inspection, depending on the conditions found. First, a carcass may be passed without restriction, meaning that when passed it was healthful, wholesome, and fit for human food. Such a carcass is marked "U.S. Inspected and Passed," or an authorized abbreviation thereof. The official number of the establishment always appears as a part of such mark, and serves to identify the carcass or part as having been inspected and passed at the establishment of that number. Second, a carcass or a part may be condemned, meaning that it is unsafe or unfit for human food, therefore must be destroyed or denatured to prevent its sale or use as human food. Such a carcass or part is marked "U. S. Condemned," and remains in the custody of an inspector until properly disposed of. Third, a carcass or a part thereof may be marked "Passed for Sterilization," meaning that it was passed on condition that it be rendered into lard or tallow, according to the species, or otherwise sterilized by methods approved by the Chief of the Bureau of Animal Industry. The explanation of this procedure is that the animal was affected with some condition or disease in such a degree that it could not be passed unconditionally; nevertheless, all objectionable conditions and all doubt as to its safety and fitness for human food can be removed by subjecting it to a sterilizing process. This process is to meat somewhat like pasteurization is to milk. There is, however, on the side of sterilization the advantage of greater certainty in the attainment of its object because of the higher temperatures employed under this process.

The flesh of a carcass passed for sterilization, whether it be in the form of a cut, such as a ham, or a prepared product like canned meats, is marked "Prepared from Meat Passed for Sterilization." The container of such cut or product also bears this inscription.

Whenever it is possible to so apply it, the mark of inspection is stamped upon the carcass, cuts, and products themselves by means of a rubber or metal ink brand. In all cases the ink used is composed of approved ingredients. Occasionally burning brands are fused for imprinting the mark on cured meats, such as hams, bacon, and similar articles. When it is not possible to affix the mark to the article itself the required inscription is placed on the container of the article; in fact, all containers of inspected and passed meats and meat food products bear the inspection legend in the form of a printed label. The legend for all labels is "U. S. Inspected and Passed under Act of Congress, June 30, 1906," or "U. S. Inspected and Passed by Department of Agriculture," or authorized abbreviation. The last quoted is the preferred form, and after July 15, 1917, was the only one approved for labels printed after that date. Other marks of inspection, chiefly marks of convenience in the conduct of the inspection, are used, but those which have been described are the only ones in which the consumer is likely to feel concerned.

Consumers owe it to themselves to look for the mark of an efficient inspection, whether Federal, State, or municipal, on the meats, and meat food products they buy, or on the containers of the same, but in doing so they should consider that the mark cannot insure perishable foods against deterioration or other unfavourable change after they have been shipped from an establishment and beyond the jurisdiction of the inspection.

HONEST LABELS REQUIRED.

The legend "Inspected and Passed" means that the meat or product was sound, wholesome, and fit for human food when it was so marked; also that the packed article was correctly labelled. The Meat Inspection Act provides that when the inspected and passed meat or product is packed in any can, pot, tin, canvas, or other receptacle or covering, the establishment shall cause a label to be affixed to such container under the supervision of an inspector, stating that the contents thereof have been inspected and passed; the Act also provides that no such meat or product shall be sold or offered for sale under any false or deceptive name. The regulations based on this provision of the law define at length what may or may not appear upon any label which is to be used in connection with meats and products. However, they all centre to one purpose, namely, that the statements on the labels shall conform to the facts and correctly indicate the contents of the package. Copies of all labels intended for use in official establishments must first be submitted to the Washington office of the bureau for examination and approval.

INSPECTION OF IMPORTED MEATS AND MEAT FOOD PRODUCTS.

The regulations governing the admission of meat and meat food products from foreign countries require that every importation shall be accompanied by a certificate signed by an official of the national government of the country of origin, stating that the animals from which the meat or meat food product was derived received an antemortem and a post-mortem veterinary inspection, and that at the time of slaughter the meat and products were sound, healthful, wholesome, and otherwise fit for human food. Further, that they had not been treated with and contain no ingredient prohibited by the regulation of the United States Department of Agriculture. Meat or meat food product not accompanied by the required certificate is refused entry, and that from a country which does not maintain a system of meat inspection satisfactory to the Secretary of Agriculture is also refused·

Every consignment of imported meat or product is checked with the foreign inspection certificate upon arrival, and is subjected to a thorough physical examination, and in most cases samples thereof undergo a laboratory examination. The meat or product is then admitted, refused entry, or condemned, according to the findings and the requirements of the regulations governing the inspection and handling of such imported articles.

The imported meat or product which is found to comply with the regulations and has been admitted into the United States is marked "U. S. Inspected and Passed," or an authorized abbreviation of the same, and with a letter or letters to denote the port at which inspection was made. When imported meats and products have been inspected and admitted the law directs that they shall be deemed and treated as domestic meats and products within the meaning of and subject to the provisions of the Meat Inspection Act.

PORK NOT MICROSCOPICALLY INSPECTED FOR TRICHINA.

Under the Federal meat inspection, pork is not microscopically inspected for trichina. There is no practicable method of microscopic inspection which is even approximately effective for the prevention of trichinosis in persons who eat uncooked pork. Careful investigations in one of the European countries in which a highly developed system is in force, have shown that nearly a third of all the cases of trichinosis, several thousand in number, which occurred during a period of 18 years were caused by pork which had been microscopically inspected and passed by the inspectors of that country as free from trichinæ. Evidence of this kind and various other considerations have led authorities to the conclusion that pork, even though it has been microscopically inspected, is not a safe article of food unless it has been properly cooked or otherwise treated to destroy any trichinæ which may be present.

In countries in which there is an established and widely prevalent custom of eating uncooked pork, microscopic inspection is perhaps justified as a means of reducing somewhat the danger of trichinosis, though, on the other hand, it tends to encourage the unhygienic custom of eating uncooked pork by creating a false sense of security in the minds of the public. Under the conditions which exist in the United States, microscopic inspection, in view of its great expense and the imperfect results, does not appear warranted. On the contrary, it is reasonably certain that if a comparatively small part of the huge sum that would be required annually for microscopic inspection were judiciously employed in extending the education of the public on the subject of trichinosis, it would do more towards the prevention of the disease in this country than any system of microscopic inspection which could possibly be established.

In the United States most persons are careful to cook pork before eating it, and there is only a small fraction of the population, of foreign origin or under the influence of foreign food customs, who follow the dangerous practice of eating uncooked pork in one or more of its various forms of preparation, such as special kinds of sausage, hams, loin rolls, etc. Considerable quantities of products of the kind just mentioned are prepared in official establishments, and for the protection of the consumers, who may be either ignorant or careless of the dangers of raw pork, the Federal Government, as an alternative to the uncertain method of microscopic examination, requires that official establishments subject all articles consisting wholly or in part of pork, if of a kind customarily eaten without cooking, to certain prescribed processes which have been found to destroy trichinæ. It is important to note that these measures employed with reference to safeguarding pork products apply only to those which are of kinds customarily eaten without cooking, and do not apply to pork products, such as ordinary cured hams, bacon, and other products, which are customarily cooked before they are eaten, nor to fresh uncooked pork.

In view of the foregoing, it may be stated that the practice of thoroughly cooking pork offers the best safeguard against trichinosis and in general it is the only preventive method which can be absolutely depended upon by the consumer. Therefore, the certain way of avoiding trichinosis is to eat no pork unless it has been properly cooked. Whoever fails to observe this precaution runs the risk of acquiring sooner or later a most painful and distressing disease which frequently terminates in death. Everyone should remember this simple rule of food hygiene: Cook pork well.

MEAT-INSPECTION LABORATORIES.

The regulations specify what may be added to meats for curing or other purposes. The use of substances which impair wholesomeness is prohibited, and only harmless artificial colouring matters may be used, and when used their presence must be declared on the product or the label. As a rule ordinary examination will not discover the presence of prohibited materials; therefore, to insure adequate examination for ingredients not permitted, also to determine soundness by chemical or other test, district laboratories fully equipped to make chemical and other technical examinations are maintained. Samples of meats and meat food products and of the materials used in their preparation are sent to these laboratories for examination. The samples are collected by the inspectors unannounced and at sufficiently frequent intervals to detect improper practices should any such be attempted.

In addition to the central and district chemical laboratories, the meat-inspection service has the co-operation and service of the several other scientific laboratories of the Bureau of Animal Industry. Frequently inspectors submit samples of diseased or abnormal tissues for diagnosis. Such samples are referred to the Pathological Division, in the laboratories of which they are tested and examined. The chief laboratory of this division is in the city of Washington, with branch laboratories in two other cities for the convenience of the more distant field stations. The numerous parasites and parasitic conditions with which meat inspection is concerned are studied by the Zoological Division, while questions relating to the biochemic changes that occur in animal tissues are referred to the laboratories of the Biochemic Division for attention.

THE NEED OF STATE AND MUNICIPAL INSPECTION TO SUPPLEMENT FEDERAL MEAT INSPECTION.

The Federal system of meat inspection has been extended to all parts of the field authorized for it by law. It is estimated that about 60 per cent. of the cattle, sheep, swine, and goats slaughtered in the United States and all imported meats are inspected under this system. This leaves approximately 40 per cent. of the domestic meat supply outside of Federal control. Much of the latter, it is known, receives no adequate inspection.

Federal meat-inspection statistics show that certain percentages of the different species of animals slaughtered are affected with some disease or condition in such degree as to require their condemnation in whole or in part. Some of the establishments at which Federal inspection is maintained have endeavoured to avoid the loss incident to condemnation by exercising great care in the purchase of animals, accepting only such as appear to be sound and healthy. This has the effect of reducing the losses at such establishment, but it also tends to divert the sale of the animals of doubtful soundness to establishments that operate without inspection. With our knowledge of the frequency of disease in food animals, the question of what becomes of the meats and products derived from the diseased and unfit animals slaughtered in the uninspected houses assumes greater hygienic importance than is usually accorded it. Dr. Charles Wardell Stiles, after having studied a large number of town and country slaughterhouses, said: "A well-regulated system of slaughterhouses is as necessary to public health as is a well-regulated system of schools to public education."

Many of the slaughterhouses which operate under no system of inspection have features that are not only objectionable but dangerous to health. Their construction is such as to make them incapable of being kept sanitary. Their water supply and drainage systems are inadequate, and but little systematic attempt is made to keep them clean, and some are inexpressibly foul and filthy. Usually there is no protection of the meat against rats, flies, and other insects and vermin, and this condition is a dangerous source of contamination and infection. To remedy these conditions it has been proposed that municipalities provide central abattoirs at which all the slaughterers of a community may conduct their operations under sanitary conditions and an efficient system of inspection maintained. This proposal has very much to commend it; in fact, central municipal abattoirs have been established and operated with complete success in many of the cities of continental Europe, and several have been established in the United States.

PERSONNEL OF THE INSPECTION FORCE.

The personnel of the meat-inspection service is divided into two general classes—professional and non-professional. The professional is composed of veterinary inspectors, laboratory inspectors, an architect, and a sanitary engineer. The non-professional consists of employees designated lay inspectors.

The veterinarians must be graduates of accredited veterinary colleges and pass the civil service examination of veterinary inspector in the service. At each meat-inspection station an inspector is selected to take charge of the work, and who reports directly to the Chief of the Bureau of Animal Industry. At stations where slaughtering is conducted only veterinary inspectors are placed in charge. The veterinary inspectors perform or supervise the regular ante-mortem and post-mortem inspections and perform all of the final post-mortem examinations. The laboratory inspectors are chemists, and also must pass an examination in accordance with the civil service requirements. They make the laboratory tests and inspections.

The lay inspectors are designated lay inspector, grade 2, and lay inspector, grade 1; they also are required to pass the civil service examination. The lay inspectors, grade 2, are experienced and well informed in regard to packing-house operations; they supervise the curing, preparation, and marking of meats and products. They are trained in passing on meats and products as to soundness, and conduct the inspection and re-inspection of meats and products. The lay inspectors, grade 1, are required to have at least three years' experience in handling food-producing animals before taking the civil service examination. Their duties are to assist the veterinary inspectors in the ante-mortem and post-mortem inspections, and to perform other duties similar to those described for the lay inspectors, grade 2. After a certain period of service they are eligible for examination for promotion to the position of lay inspector, grade 2. It is the duty of every employee, whether veterinary inspector or lay inspector of either grade, to see that the sanitary regulations are observed in their respective departments.

Certain veterinary inspectors, selected for their experience and general qualifications, are known as travelling veterinary inspectors. They inspect the official stations and establishments in their respective territories and report to the chief of the bureau whether the regulations and instructions governing meat inspection are properly observed. Their visits are unannounced and their reports are valuable in their effort to secure a uniform inspection and the enforcement of the sanitary regulations.

The personnel at present consists in round numbers of 800 veterinary inspectors; 1,000 lay inspectors, grade 2; 700 lay inspectors, grade 1; and laboratory inspectors, administrative officers, and clerical forces to bring the total to about 2,650 persons.

STATISTICAL.

The following very brief statistical summary is by no means an adequate statement of all the work performed under the Federal meat-inspection system. It will suffice, however, to convey to the reader an idea of the magnitude of the service.

The number of establishments at which inspection is regularly maintained varies somewhat; however, for several years it has approximated 850, and includes practically every establishment of importance or large volume of operations in the United States. In the last five fiscal years preceding this writing the total of cattle, sheep, swine, and goats given the ante-mortem and post-mortem inspections was in excess of an average of 58,500,000 per year. The average number of whole carcasses of such animals condemned during that period was more than 262,000 per year, while the number of parts of carcasses condemned per year was very much greater. The records of the inspection and re-inspections of meats and products subsequent to the slaughter inspection show totals running into billions of pounds annually, while the amount condemned on re-inspection on account of having become tainted, rancid, or otherwise unfit for human food, has approximated 18,000,000 pounds per year.

For the fiscal year preceding this writing, the sum appropriated by Congress for meat inspection was $3,375,000, within which sum the service was maintained. In other words, the cost was less than 6 cents for each of the 58,500,000 animals slaughtered. This charge covered the entire service from the first inspection of the live animal to the final examination of the meats in the finished products, when ready for delivery to dealers or consumers. In this connection it seems but right to add that there has been no sacrifice of efficiency and completeness to attain this low cost; on the contrary, it is the constant aim of the department to strengthen the service in these respects

Reviews.

ANNUAL REPORT OF THE CIVIL VETERINARY DEPARTMENT, BIHAR AND ORISSA, FOR THE YEAR 1917–1918.—Printed at Patna by Superintendent of Government Printing, Bihar and Orissa. Price 8d.

THIS report is sent to us by Mr. D. Quinlan, M.R.C.V.S., Superintendent of the Civil V.D. It comprises seven pages, with numerous statistical tables of disease. Foot-and-mouth disease was very prevalent, and owing to rains, floods, and bad roads the outbreaks were in many cases difficult to get to. Rinderpest occurred in all districts, and was difficult to deal with owing to local religious prejudice against any interference with cattle; 108,950 cattle were inoculated against different contagious diseases, rinderpest, hæmorrhagic septicæmia, anthrax, and black quarter being the diseases dealt with. Since September, 1917, all biological products from the Muktesar laboratories have been charged for—53 travelling veterinary assistants were in the employ of the department, and 69,122 cases were treated by them. There were 540 castrations conducted at the hospitals, and 30,820 animals treated. No research work was carried out. The cattle breeding farms did well. The low scale of pay and bad prospects have kept back the development of the Department.

Mr. E. Lister, secretary to the Government, comments favourably on Mr. Quinlan's work in a leaf at the end of the Report. He says :—"The conditions in which the Department is at present working are such as to fix very narrow limits to its efficiency, while they impose an undue burden on the Superintendent."

A new and desirable feature in this report is a map (in true war spirit) showing by various alignment the districts where the different cattle diseases prevailed. G. M.

COMMON DISEASES OF PIGS AND THEIR DIAGNOSIS, INCLUDING SWINE FEVER AND ITS TREATMENT WITH SERUM. By Ernest Peacey, F.R.C.V.S. Crown 8vo. Pp. viii—114. Price 3s. 6d. net. Publishers: Messrs. Bailliere, Tindall & Cox, 8, Henrietta Street, London, W.C. 2.

This is a useful book for veterinarians, dealing with the diagnosis of many of the contagious and infectious diseases of the pig. Swine fever, swine erysipelas, anthrax, pneumonia, and tuberculosis are well discussed. The origins of the last-named disease might very well have been summarised by the writer, and something said about its prevention. The serum treatment of swine fever is briefly referred to, but nothing is said about the technique of its application. As regards disinfection and the statement that only where fæces are fresh is there danger of infection, and also that where a stye is left empty for two or three weeks without being disinfected it is safe for fresh pigs, we express doubt as to its accuracy. It is the organism that causes swine fever that we have to deal with. The cleansability of the stye floor is a factor in effective disinfection, and we prefer to take the authoritative view that hog-cholera pens if left alone *may remain dangerous for at least a year,* and that the virus is not destroyed "even by the freezing weather in Iowa in the winter months." As far as the book goes, and it deals with some twenty-two diseases of swine, it may be read with interest and profit, but one feels sometimes that the author is writing with a good deal of restraint and does not let himself go. His views are those of a practical man of twenty years' experience, but some of the information in the book is quite too curtailed, and there are some rather bad omissions. The character of the fæces of a healthy pig as given by the author is not very informative. In the *Breeds* of pigs at page 9 surely the *Large White* ought to have a place. We keep hundreds of them in the North of England. The author does not appear to have seen medicine given to pigs as an electuary. As an old hand, I can recommend the method to him as being one of the best both for the pig and the attendant. At page 16 a caution is given about putting down briny food after giving sulphur as medicine, because *poisonous reactions* may occur. What are the poisonous reactions? In "errors of diet" we think that potatoes given to pigs under three months of age is to be condemned, and there is often a tendency to give too large a quantity at all ages. We have known many deaths in young pigs from this error and some in adult pigs. We should like to know the names of the counties where "a castrator is required by the authorities to keep a record of his pig castrations." The author says it is the rule in *most* counties. "Septic poisoning" is mentioned as following castration; probably "septic infection" is meant, but no precautions to prevent it are given. The castration of pigs is far too happy-go-lucky an operation even at the present day, and we think there is negligence in dozens of cases; a bigger price ought to be charged for the job and more antiseptic precautions taken. We question whether partial paralysis is more common in sows than adult pigs, and many cases we have seen have been in hogs and probably due to rheumatism or rickets. There are many common diseases of swine totally omitted from the book, *e.g.*, rhinitis, rickets, eczema, diarrhœa of young pigs, urticaria, ringworm, etc. The author says he has "no knowledge of any publication dealing with the differential diagnosis of the diseases of swine," but we can easily name half a dozen, three of which are written in the English language. The book can be well recommended, and it ought to be a factor in enabling practitioners to get away from the belief prevalent some years ago, and even existent in many quarters to-day, namely, that a sick pig must necessarily be suffering from swine fever.

G. M.

Personal.

MR. JACK WILLETT, M.R.C.V.S.

THE honour which has recently been granted to Mr. Jack Willett, M.R.C.V.S., of being gazetted "An Honorary Veterinary Surgeon to His Majesty the King," is one which is well deserved, and the selection will be extremely popular in the profession, especially amongst the practitioners of London and the Home Counties, amongst whom his integrity is well known. It is an honour which has only been granted once before, and the fact of its being a "gazetted appointment," instead of a "tradesman's warrant," is an acknowledgment that our calling is a profession and not a trade. It is an honour conferred upon our profession in the same way as is similarly done to members of the medical profession, and it is necessary for the continued social advancement of our profession that future appointments shall be made and accepted on a similar basis. Mr. Willett comes of veterinary stock, his father being a well-known practitioner at Staines, and his two brothers (one of whom is at present serving in the Army) are each very busy practitioners, and very popular. After graduating in Edinburgh he came to London, where he acted as assistant for some years before settling down "on his own" in his present locality. In London he has built up a large horse and dog practice, and amongst his neighbouring practitioners he is deservedly known as "my honourable opponent." In the social advancement of the profession he has always been a forward figure, having been President of the Central and Royal Counties Veterinary Societies and taking a prominent part in the National Veterinary Association and the Victoria Benevolent Fund. In conjunction with his late wife, his name was always prominent in charitable works connected with the profession, notably Mrs. Moore's A.V.C. Comforts Fund, and Victoria Benevolent Fund.

In wishing him long life to enjoy this new distinction, we are sure that we are echoing the voices of all his numerous acquaintances and friends in the profession.

MR. GEORGE GAIR, M.R.C.V.S., Cononbridge, Ross-shire, has been appointed to the position of bacteriologist to the Ross Memorial Hospital, Dingwall. Mr. Gair's appointment after three years' valuable work for the County is an honour to the veterinary profession.

CORRECTION.

In the September issue, in the article on "The Necessity for Abattoirs," by Thomas Parker, page 339, line 12, "Accession" should read "Accension."

NOTICES.

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THE

VETERINARY JOURNAL

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Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

DECEMBER, 1918.

Editorials.

MILK-BORNE DISEASES.

These diseases are interesting to us from the point of view of tracing their origin, and it is well to bear in mind the human complaints that may be spread by milk. The list comprises typhoid and para-typhoid fever, diphtheria, septic sore throat, scarlet fever, tuberculosis and cholera. Milk supply may be suspected where a large number of cases occur at the same time in families receiving milk from a certain common source ; the disease may be of a mild type and the mortality low ; women and children may be chiefly affected, because drinking the most milk. Where official action is followed by a quick drop in the number of new cases of disease it is pretty good evidence that the source of the disease has been discovered. There is reason to believe that the cow may occasionally be the originator of one of these human ailments, viz., septic sore throat. It can hardly be expected that milk from cows with streptococcic mammitis can be consumed by human beings without a chance of sore throat arising, and there must be some danger to children, and even adults, too, from consuming a supply from cows with discharges from the womb or vagina, internal disorders, or sores on the teats or udder. Perhaps typhoid fever is the most frequent of the milk-borne diseases, and water, flies, dust, and chronic bacilli carriers (human beings that have suffered from typhoid) are sources of infection. The spread of diphtheria by milk occurs less frequently than that of typhoid fever, but several cases of the kind have been recorded. The milk is not changed in appearance by the presence of the diphtheria bacillus, but a comparatively low degree of heat (140° F.) is sufficient to kill the organism.

In another part of this issue we publish a very interesting account of the transmission of diphtheria by cows' milk, and it is noteworthy that in this connection Mr. G. Gair, M.R.C.V.S., the writer of the article, incriminates flies as a cause of the outbreak. The fly as a spreader of disease is receiving far more attention than formerly. There is reason to believe, as not a few observers have recently indicated, that *Musca domestica* is a factor in the spread of mammitis from cow to cow. The insect is quickly gaining the reputation of a veritable wolf in sheep's clothing. Mr. Gair's ways of dealing with the infected milk and the sewage tank are worth remembering. G. M.

NECRO-BACILLOSIS.

WE print in another column a very interesting communication on "Gangrenous or Necrotic Dermatitis" in the donkey transport in German East Africa.

This disease has caused serious losses in all theatres of the war, and especially on the Flanders Front in the winters of 1915–16 and 1916–17.

The malady in question—necro-bacillosis—generally makes its appearance with suddenness, and the lesions when once established are of such a type as not only to incapacitate by a long surgical disability, but also to threaten a fatal issue unless energetically and appropriately handled.

Excessive and rapidly developed lameness leads to the detection, on examination, of a ragged, unhealthy-looking sore, generally at the hoof-head, and apparently the result of a "tread" or injury inflicted by the shoe. The heel is sometimes the site of the primary lesion, but more frequently the trouble starts at the coronary band, and rapidly develops into a spreading gangrenous lesion discharging a thin, offensive fluid, and threatening to involve the deeper structures—a sequel which invariably follows surgical neglect. Lameness is excessive, constitutional symptoms run high, and a fatal termination is the early and frequent result unless energetic treatment is directed to the lesion and the cause—a microbic invasion by an organism of the anærobic type, which is present in the organic mud of the kraal or standings or the roads in its near vicinity. Wet weather—which connotes mud—is generally associated with the disease, as is the presence in the mud of a high percentage of organic (fæcal) matter. The presence of an abrasion seems essential to the lodgment of the microbe.

The fact that this organism is an anærobe suggests the first principle of treatment, viz., free exposure of underrun parts and vigorous surgical measures to arrest spread, by the removal of necrotic centres of re-infection.

Following this procedure, the frequent placing of the foot in a bucket of hot permanganate solution for a short time, and the subsequent application to the lesion of firmly applied antiseptic dressings, will lead to a convalescence, the length of which will depend upon the extent of tissue involved.

Captain Henderson has found the use of pure oil of turpentine an effective dressing, promoting granulation and acting as a powerful and penetrating germicide. This treatment recommends itself on the grounds of simplicity and efficiency, and might well take the place of, or be used in conjunction with, the system of hot lavage with potassium permanganate.

If necrosis of the coronary band has occurred to such an extent as to involve the future integrity of the wall of the hoof, the question of the expediency of attempting treatment may arise.

The outbreak may assume serious dimensions before the state of infection of the ground, and the consequent necessity for precautionary measures, is recognised. Routine washing of the feet of such animals, or the passage through a shallow foot-bath containing a solution of sulphate of copper, will be found to control the tendency to the disease.

The chief points to be recognised appear to be the liability to infection in foul ground, and the necessity of an initial, prompt and energetic oxidising treatment. M.

Original Communications.

GANGRENOUS DERMATITIS.

By Captain W. W. HENDERSON.

Veterinary Officer, Port Amelia.

From the return it will be observed that a total of 68 donkeys treated were exhibiting a condition which I have termed Gangrenous Dermatitis.

This condition has proved very refractory to cure, and has caused considerable inconvenience to the Units concerned. More especially has this been the case with the donkeys of the Animal Transport, L. of C., where at one time 30 per cent. of their total strength were under treatment and incapacitated from duty.

The disease, as it almost invariably presents itself, is localised to the skin and underlying tissue in the region of the heel and coronary band, but from the original site, if not treated early and energetically, spreads rapidly in all directions and invades the deeply-lying structures, tendons, ligaments, and even bones.

Unfortunately in most cases, more especially in donkeys, where the difficulties of detecting the lesion in its initial stages are great, the disease may be in existence for a day or two, and there is marked lameness when the animals are brought in for treatment.

The local lesion is a necrotic gangrenous wound of variable size, met with usually in the region of the heel; there is a very persistent foul-smelling purulent discharge of a greyish colour, in which may be found small particles of dead tissue.

The edges of the wound are rugged, not well defined, and of a necrotic character.

The gangrenous necrosis spreads with alarming rapidity, and within 24 hours of first being noticed the wound may have doubled its circumference and burrowed so deeply that certain important underlying structures have become involved, such as tendon and tendon-sheaths, with a corresponding increase of pain and a corresponding decrease in the prospects of an ultimate recovery.

In fact, when once the necrotic process has invaded the tendon-sheaths or other underlying structures, destruction is the only course indicated.

Treatment.—The necrosis and gangrene must be arrested and the adjacent and still healthy tissue encouraged to throw off the attached gangrenous slough

For this purpose I have found the application of pure turpentine to the wound and the removal of all loose tissue to have a most marked effect.

The turpentine is not only a strong penetrating antiseptic, but has a decidedly stimulating action on the adjacent healthy tissue, causing a well-marked leucocytosis and, in favourable cases, within 48 hours, sloughing of the dead tissue leaving a healthy granulating surface underneath.

As soon as the slough has separated and granulations well advanced, there is no danger of a further extension of the necrosis, and the healing process goes on uninterruptedly.

In conjunction with the above I use the following liniment soaked in cotton wool and bandaged to the part :—

Ol. Tereb.	oz. ii	applied twice daily.
Zinc Oxid.		
Boric Acid a a	oz. ii	
Tar or Disinfectant Fluid ..	oz. i	
Ol. Lini. ad.	oz. xxiv	

This application has the effect of encouraging healthy granulations and rapid recovery.

The mortality from this condition has been rather high in donkeys, firstly, from the usually advanced state of the necrosis before treatment is commenced, and, secondly, owing to the donkey propensity for licking and eating wounds great difficulty is experienced in keeping the parts bandaged and the wounds free from flies.

This treatment has given quite satisfactory results, and certainly is superior to other forms I have tried in the past.

ABOUT HÆMATOZOA AND THEIR INTERMEDIARY "CARRIERS" OR "BEARERS."

By THOS. B. GOODALL, F.R.C.V.S., F.L.S.,
Christchurch, Hants.

It is now universally admitted that the various forms of blood-parasites, each inducing a specific disease in the infected "host," cannot be transmitted direct from one host to another, but are dependent upon an intermediary carrier for their transference; and the first duty of those called upon to deal with these diseases is, after finding the causal organism in the blood, to ascertain, if possible, what is the "carrier." So far this has always been found to be some creature that lives on the blood of the host, such creatures as ticks, fleas, lice, blood-sucking flies, and possibly some acarina.

In some of these the bearers are necessary for the sexual cycle of the parasite, as, for example, the strange life-history of the malaria parasite.

In others the organism is transmitted by direct inoculation, such as the Trypanosome of Ngana disease by a Tsetse-fly, and so it behoves us to devote even more and more attention to the habits, life-histories, and *the natural enemies* of all creatures that are parasitic on man and the higher animals, if we would deal successfully in the suppression of diseases induced by hæmatozoa.

Until quite recently comparatively few entomologists have taken up seriously a study of the Diptera, and those have received little or no encouragement from the State.

In 1891 Mr. F. V. Theobald commenced the publication, in one shilling parts, of his great work, "An Account of British Flies," but after the issue of the first six parts he wrote to his subscribers, of whom I had the honour to be one, that he had already lost so much money on the venture that he did not feel justified in going on with it. Since then, I am glad to say that a part, at least, of his work, a Monograph of the Culicidæ, has been published by the Trustees of the British Museum, and is now probably the standard work on the subject.

Where hundreds have devoted themselves to a study of the Coleoptera or Lepidoptera, very few indeed have been attracted by Diptera.

What makes a knowledge of blood-sucking flies of importance is their association with disease in man and the higher animals.

The great discovery by Ross in 1897 that the malarial parasite passed its sexual cycle in the body of Anopheles, and a little later the splendid work of Col. Bruce, proving that the Trypanosomes causing the deadly Ngana disease of horses and cattle were conveyed from tolerant big game animals to imported domestic animals by a Tsetse-fly, gave a great stimulus to a more careful study of the Diptera, and I do not think it will be out of place to give a short summary of the events that led up to this.

The causal organism of malaria was first discovered by Laveran, a French army surgeon serving in Algeria, in 1880.

In 1885 Italian pathologists came round to Laveran's views, and showed that the periodic attacks of fever in malarial patients corresponded with the development of the organisms.

An old popular belief had long before this connected mosquitoes with malaria.

In 1894 Manson, arguing from analogy of his own discovery of the part played by mosquitoes as carriers of filariasis, suggested a similar intermediate host.

In 1895 Ross, following up this line of investigation, found that if a mosquito sucked blood containing the parasites they soon began to throw out flagellæ, etc.

In 1897 he followed out the life-history of the malarial parasites of birds, and showed that certain peculiar pigmented cells, which he had found in the stomach walls of mosquitoes, were parasites of æstro-autumnal malaria in an early stage. He saw them through all their stages in the mosquito and the bird.

To apply these discoveries to the malaria of man was an obvious step.

In 1898–1899 and 1900 interesting experiments were carried out showing that persons protected from the bites of mosquitoes in notoriously malarial regions escaped, while others—exposed—contracted the disease

The life-cycle of the parasite was first discovered by Ross, and it was he who pointed out that it was only in the body of the Anopheles that it could develop.

It passes through a sexual cycle in the body of the mosquito and an a sexual cycle in the blood of man. They occupy and destroy the red corpuscles.

The number in the blood in an acute attack is reckoned by Ross to be not less than 250 millions.

To show the great stimulus given to the study of the Diptera by these discoveries I will state briefly how rapidly the numbers of known and described Culicidæ have increased during the last few years.

In Westwood's "Modern Classification of Insects," published in 1840, only *six* genera of the Culicidæ had been then characterised, and three of these were British p. [512).

He mentions (p. 507) the gnat of Lapland (so graphically described in Alfred Russell Wallace's "World of Life") as the true *Culex pipieus.* (He mentions Anopheles. (p. 508).

The musquito, moustique, or marinqouin, which appears to be a species of this family (Culicidæ), is far more annoying in its attacks upon the inhabitants of America and India than our European species is to us, etc.

He quotes from Herodotus that the ancient Egyptians guarded themselves against gnats, and also the ancient Greeks, by the use of nets.

In Kirby's "Text-book of Entomology," published in 1885, only one short sentence is devoted to the Culicidæ, as "too well known all over the world as gnats and mosquitoes."

But when we come to Stephens' and Christopher's Practical Study of Malaria," published in 1904, we have 25 genera of Culicidæ; with something over 200 species. and 12 genera of Anophelindæ with 80 species.

And when I take up this latest book, "Mosquitoes and their Relation to Disease," by F. N. Edwards, published in 1916 by the Trustees of the British Museum, I note that he says: "There are, in reality, about a thousand different kinds of mosquitoes known, and they inhabit every country of the world. In Britain we have no fewer than eighteen kinds."

There are about one hundred known species of Anopheles.

From Stephens' and Christopher's "The Practical Study of Malaria."

Among the groups into which the Protozoa are divided we find such well-known classes as the Sarkodina, of which Amœba coli is an example; the Mastigophora, possessing flagellæ, as the Trypanosomes, of which there are a great many, and the Sporozoa.

The Sporozoa include such orders as the Gregarines and the Hæmosporidia, which include the malaria parasite of man, and blood-parasites of birds. (It also includes the blood-parasites of cattle, dogs, horses, etc.)

There are many forms of filaria carried by gnats.

Organisms causing plague are carried by the rat and its flea.

My friend Dr. A. C. Coles, of Bournemouth, one of the most patient and persevering microscopists of the day, has recently demonstrated a Spirochæte in the kidney of the rat, which is the causal organism of epidemic jaundice, and now the riddle will be how to find the intermediary bearer between rat and man.

THEIR MODE OF WARFARE.

Pathogenic organisms do not always destroy directly, though the malaria parasites, and the Trypanosomes destroy the red corpuscles of the blood.

But others produce their deadly effects by giving off poisons or toxins.

Besides these toxins Metchnikoff demonstrated that certain of the Leucocytes have the power of absorbing and digesting foreign invaders; to these he gave the name of Phagocytes. They are always patrolling the blood current, ever on the watch for intruders.

The use of poison gases in modern warfare is but a crude imitation of what has been going on in the incessant struggle for existence in animal bodies, which may be regarded, in this sense, as huge empires, through all time.

An enemy in the form of a blood-parasite invades the body or empire and gives off a toxin, which, if not dealt with promptly, means death. To meet this, certain guardian cells (the leucocytes) have the power of emitting a counter-poison, or anti-toxin, which neutralises the original; and so the warfare proceeds until one side or the other is victorious.

Modern research seeks to find out what are the anti-toxins of the organisms producing specific diseases, which are then made artificially and injected into the blood or tissues of the patient, and so helping and stimulating the anti-toxins to resist the invasion.

In this warfare it is not a question of conscription or voluntary service, but every unit of the empire continues to resist the invaders. Thousands—millions—may perish, but others take their place without thought of self.

Animals and man in their natural environments sometimes become tolerant, and then act as reservoir hosts.

Here is a short extract from Sir E. Ray Lankester's "Advance of Science":—

"The wild creatures, brought into a condition of 'tolerance' by natural selection, and the dying out of those susceptible to the poison, form a sort of 'reservoir' of deadly Trypanosomes for the Tsetse-flies to carry into the blood of newcomers. The same phenomenon of 'reservoir' has been observed in the case of malaria; the children of the native blacks in Africa and in other malarious regions are tolerant of the malarial parasite, as many as 80 per cent. of children under ten being found to be infected, and yet not suffering from the poison.

"How great is the contentment of those who have long worked at apparently useless branches of Science in the belief that all knowledge is good, to find that the Science they have cultivated has become suddenly and urgently of the highest possible value."

We have already alluded to the danger of introducing fresh stock or men into countries where there are tolerant hosts, for the blood-parasites of these reservoir hosts are introduced into their blood with fatal results.

But surely the danger is ten-fold when a few tolerant men or animals or "reservoir" hosts are brought into direct contact with clean or fresh men or animals.

For it seems to me not only possible, but highly probable, that when a bearer of disease inducing organisms, himself tolerant to their presence, is transferred from a country where they are rife to another country and environment, not only gnats and mosquitoes, but any blood-sucking flies, furnished as they are with such perfect inoculating instruments, may transmit sufficient of his infected blood to the body of another man to induce in him a serious disease.

This war will add much to our knowledge of the real factors in the spread of disease, for sick and wounded men coming from all over the world are being transported to new environments, many of them, most probably, carriers of hæmatozoa in one form or another, themselves tolerant; and one such man, being exposed to the bites of flies, might well be a centre for a big population being the victims of some so-called new disease—so we see the importance of a knowledge of the subject.

Though the malarial parasite, as proved by Ross, passes its sexual stages in the body of Anopheles, it may pass many asexual stages in the blood of man; and besides these parasites there are the others I have mentioned—Trypanosomes, Filariæ, etc, and I adhere to what I have maintained for years, since the seventies, when I first took up the subject, that it is possible for any blood-sucking fly to carry these organisms from host to host. *If they did not often* do it in their own country and environment they might in a new country and new environments.

Our Government, I believe, are awakening to the fact that we might be threatened by such an invasion, and are making enquiries about the localities in which gnats and mosquitoes may be found in more or less abundance.

As an illustration of the manner in which blood-parasites might be carried by tolerant hosts to other countries, let us think of the remarkable life-history of the *Gastrophilus equi.* I have found a mature fly of the English *Gastrophilus* in South Africa, and from a "hot" pupa from an American horse at our barracks in 1915 I reared the mature American fly.

Knowing, as we do now, that piroplasma are carried through all the stages in the life of a tick, I suggest the possibility that even the generally considered harmless *Gastrophilus* might be an intermediary carrier of hæmatozoa. I will go further, and say that, in our present state of knowledge, all parasites, external and internal, should be looked upon with suspicion as possible "carriers."

Only last year the body-louse was proved to be the intermediary bearer of the causal agent of trench-fever.

We sometimes hear men speaking of a *new* disease. There is no such thing; the micro-organisms inducing the state of our bodies we term disease have been in existence through œons of time, probably long before man made his appearance on earth, and they have lived and multiplied in their normal element and environment, which is the blood of higher animals, but we have only lately perfected the means of discovering them.

But they could never have been transported from one host to another by any inherent quality of their own, and so, from the very beginning, flies and other agents that derived their nourishment from the blood of animals evolved organs, it would seem, specially adapted for the purpose.

Before the advent of man, the balance of life was maintained, probably smoothly; if there was a superabundance of one form it was checked by another, and the equilibrium was maintained.

But when man introduced civilisation and took himself and imported his flocks of sheep, herds of cattle, and his artificially bred horses into new countries, the Tsetse-fly, the tick, and the mosquitoes conveyed the organisms from the natives and the native fauna to himself and his flocks and herds with disastrous results.

The principal carriers of these parasites from host to host are believed to be gnats and mosquitoes and ticks, though we must bear in mind that other parasites must be regarded with suspicion.

And they are not only dangerous in this respect; for the Culicidæ do not feed on blood alone—indeed many of them never get the chance (I have reared two generations of the *Dixa* in a glass jar containing sewage water, from which they never came out), but they feed on putrefactive matters found in such substances, and you may fancy a gnat enjoying such a feast being disturbed by a man or boy—it leaves the filth for a more bountiful and enjoyable feast on his blood, and introduces its filth-covered mouth-organs into the circulation of its disturber with dire consequences—real blood-poisoning.

Some two or three years ago my own little grandchild was bitten by a gnat on the eyelid, which led to such grave symptoms that fears were entertained that he might lose the eye.

The mouth-organs of the blood-sucking flies are perfect inoculating instruments.

The terms gnats and mosquitoes are synonymous and interchangeable, like apes and monkeys, for, in a sense, a gnat is a mosquito and a mosquito is a gnat.

They belong to the family Culicidæ, which contains several genera and a large number of species.

The term "mosquito" means originally, in the Spanish, a "little fly," and has been applied in different parts of the world to many different species, though now, amongst pathologists, it is generally agreed that when the word is used it refers to Anopheles, distinguished primarily from the ordinary gnat by the great length of the maxillary palpi, though this is not the only difference. It is spoken of in this country as the spotted gnat.

DISTINCT FEATURES OF ANOPHELES AND CULEX.

In the resting position the *Anopheles* stands with the two pairs of front legs on the wall or whatever it is resting on, and the hind legs and the body raised at a distinct angle from the surface, whereas *Culex* has the hinder part of the body disposed *towards* the surface, giving the gnat a hump-backed appearance.

The wings of *Anopheles* are spotted or dappled; those of *Culex* are not.

The larva of *Anopheles* does not frequent sewage or foul water; that of *Culex* does.

The larva of Anopheles has no respiratory syphon, that of Culex has.

Anopheles rarely bites by day, and is not attracted by light in a room.

The palpi of Anopheles are as long as the proboscis, those of Culex are short, perhaps about one-quarter the length, and this is the character by which they can be most easily recognised.

In this country—speaking now from my own observations—the impregnated females of the Culicidæ pass the winter in a state of partial hibernation (*i.e.*, they are never so far insensible to their surroundings as not to take to a feeble flight when they are disturbed) in quiet, cool places, where they are not likely to be disturbed, and they appear instinctively to choose such places about the rafters of sheds and outhouses, or rough stables or cellars or disused rooms, generally near where tubs are kept for catching rain-water.

Modern mosquitoes have been classified by Theobald by the character of the body and wing-scales.

They are also distinguished by the venation of the wing.

In all mosquitoes the two posterior forked cells towards the apex of the wing are divided by a single longitudinal vein, and the veins are covered with scales.

These two characters will readily distinguish mosquitoes from all other flies.

Amongst modern mosquitoes known to be carriers of disease might be mentioned specially—

(1) *Anopheles maculipennis*—a carrier of malaria.

(2) *Stegomyia fasciata* or *Ædes calopus*—the only carrier of yellow fever.

(3) *Culex fatigans*—the chief carrier of elephantiasis.

A Few Notes from my Notebook.

Dec. 26th, 1890.—After a fortnight of severe frost, during which I had kept exposed in a cold room a gnat, a Cyneps, and a bumble bee, they are all alive, notwithstanding the severity of the weather, which proves that other insects besides Lepidoptera may pass the winter in a state of hibernation in the adult stage.

1891, April 11th.—I have kept some of the larvæ of *Chironomus plumosus* all through the winter (a severe one) in water in small glass vessels.

They make for themselves cocoons of their own excrement and any other particles of matter at the bottom of the water, and in these they have remained all the winter.

During the severe frosts the water in which these larvæ were kept was frozen into a solid block of ice; while the larvæ were thus embedded in the ice I noticed a small air-bubble at the caudal extremity of each larva.

Notwithstanding this they were all alive and well after the frost.

The first larva took on the pupa-stage on the 7th, and my first mature imago, a male, has emerged from the pupa to-day, the 11th, having thus survived all his exposures and hardships.

Gnats.

1892, Jan. 31st.—There are some dozens of small black gnats, since identified as probably Chironomidæ, on the window of my study, two of them infested with acarian parasites (*Sejus*). Where had the larvæ of these flies been living—not in water—or had they been hibernating ?

I have since noticed, after reading up the subject, that these gnats may be seen on any warm day in winter on the wing.

1893, June 14th.—I have reared these gnats from larvæ and pupæ found under the bark of dead elm trees—the flies, or imagos, came out to-day. One may suppose, therefore, that the *habitat* of their larvæ is rotten wood or bark or the damp cambian layer between the wood and the bark of dead trees.

1914, March 1st.—Captured hibernating female mosquito in surgery lobby.

1917, Dec. 10th.—Disturbed a hibernating female Culex in my greenhouse.

GEOLOGICAL DISTRIBUTION.

Besides being the carriers of these minute organisms from host to host, have mosquitoes any other rôle in the great scheme of Life ?

For an answer let us turn to that charming book, " The World of Life," by the late highly esteemed Dr. Alfred Russell Wallace, which I never tire of reading.

In the preface he tells us that in all the marvellous structures of living things there is absolute necessity for an Organising and Directive Life-principle in order to account for them. He says :—

" I argue that they necessarily imply : First, a Creative Power, which so constituted matter as to make these marvels possible.

" Next, a Directive Mind, which is demanded at every step of what we term growth.

" And, lastly, an ultimate Purpose in the very existence of the whole Life-world in all its long course of evolution throughout the æons of geological time."

What, then, is the Purpose of mosquitoes ? Quoting from Mr. Seebohm's books on the migration of birds to the Arctic regions, he tells us they are attracted there for breeding in the short Arctic summer, many of them (and he identified 165 species, comprising many millions of individuals) by the swarms of mosquitoes.

" That day (June 2nd) I recorded in my journal, with many groans, the arrival of the mosquitoes. Horrid-looking beasts, with bodies one-third of an inch long, monsters—the *Culex damnabilis* of Rae—with proboscis *infernali veneno munita* (which I translate ' diabolically fortified with poison'). I foresaw that we should have opportunities enough to study the natural history of these bloodthirsty creatures to our hearts' discontent."

About a month later he writes when searching for eggs, properly identified :—

" Doubtless the proper thing to have done would have been to lie down and watch the birds into their nests ; but to become the nucleus of a vast nebula of mosquitoes is so tormenting to the nerves that we soon came to the conclusion that the birds had not begun to breed, and that it was no use martyrising ourselves to find their eggs. The mosquitoes were simply a plague. Our hats were covered with them; they swarmed upon our veils; they lined with a fringe the branches of the dwarf birches and willows; they covered the tundra with a mist."

But this was quite at the beginning of the season, and he adds :—

"We were told that this pest of mosquitoes was nothing as yet to what it would become later. 'Wait a while,' said one Job's comforter, 'and you will not be able to see each other at twenty paces distance; you will not be able to aim with your gun, for the moment you raise your barrel half-a-dozen regiments of mosquitoes will rise between you and the sight.'"

And Mr. Seebohm described how he was protected by india-rubber boots and cavalry gauntlets, and a carefully constructed cage over his head, without which he never dared go out on the tundra.

I have but touched the fringe of a big and important subject.

It is true of the British Coleoptera and Lepidoptera that a man must work very hard before he can hope to add a new British species to either order; but any entomologist who cares to take up a study of the Diptera may find himself able to add considerably to our store of knowledge.

Even amongst our commonest insects the habits and structure of any one species would furnish any person with a taste for such pursuits with sufficient employment for a lifetime. The collector's province may be exhausted in a few years, but the observer's—*never*.

When an observer fixes his attention reverently on any living thing, and discovers peculiarly specialised parts or organs, he asks himself, "What is this? How has it come to be as it is? What is its purpose?" And so, in this spirit, we must recognise and acknowledge, behind these wonderful mouth-parts of blood-sucking flies, a Creative Power, a Directive Mind, and an Ultimate Purpose; and, though we have not yet arrived at the exact truth, it appears to me quite certain that those coming after us will discover that the purpose of these has been through long ages of time, and is still, the transference of these minute organisms from host to host, in nature and in natural environments, in such small and repeated doses as either to render the hosts tolerant, or to kill off the weakly in the struggle for existence.

It is the interference of Nature's insurgent son—Man—that has brought about so much confusion, and has imposed on him the task of bringing order out of the chaos he has created One of these tasks is to check the ravages of these blood-parasites which he has been the means of transporting from their own environments all over the world, and to do this a knowledge of their intermediary bearers—blood-sucking flies, ticks, etc—is incumbent.

A couple of short quotations from Lowell seem to me to be specially applicable to the progress of Science :—

New occasions teach new duties ; Time makes ancient good uncouth ;
They must upward still and onward who would keep abreast of Truth.

New times demand new measures and new men ;
The world advances, and in time outgrows
The laws that in our fathers' times were best :
And, doubtless, after us, some purer scheme
Will be shaped out by wiser men than we,
Made wiser by the steady growth of truth.

TRANSMISSION BY COWS' MILK OF B. DIPHTHERIÆ.

By G. GAIR, M.R.C.V.S.,
Conon Bridge.

EARLY in July this year a serious outbreak of diphtheria occurred in a certain district of this county. The Medical Officer of Health for the county instructed me to make a thorough investigation with the object of ascertaining the source of the outbreak ; the investigation was to include the bacteriological examination of the milk and water supply of the various dairies supplying the affected area. The examinations were duly made, and reports forwarded to the Medical Officer, a duplicate of which was sent by him to the Local Government Board. Considering how little is known of the morphology or habit of this small organism outside the human body, it must be evident how difficult it is to isolate it outside the human throat and so discover the source of infection. It is well known that an important part is played by dry infected material, dust, etc., in bacterial contamination of milk and other food-stuffs. The most important source of infection is by human carriers. In these people the crypts of the nostrils protect the bacilli from the action of ordinary antiseptic dressings. They may be also found in the nose, in otitis media, pharynx, wounds of animals, and various chronic suppurating conditions, *i.e.*, poll evil, fistulous withers in horses, etc. With exception of fatal cases in the lungs of people, the organism is entirely local, and does not enter the circulation or viscera. It is frequently associated with staphylococci, streptococci, pneumococci and cocci of the micrococcus catarrhalis type, etc. (symbiosis). For the purpose of ascertaining whether the milk supply was implicated I made a careful examination of the udders and teats of the cows, but no sign of abrasion or old scars was found on them. Samples of milk were taken from each of the dairies, plated on blood serum and blood agar, incubated for eighteen hours at 37° C., with the result that characteristic colonies were observed on the tubes plated with milk of a certain dairy ; colonies appeared almost the size of pin-heads, convex surface, whitish yellow in colour, circular, moist, and opaque in appearance, remained discrete, did not tend to run together. Although Loeffler's coagulated blood serum is the best medium to use for diagnostic purposes, I found the growths on the blood agar tubes very luxuriant. It could not be said that the colonies on blood serum showed any special features, as some cocci show colonies which would be difficult to distinguish, microscopically, from those of the Klebs-Loeffler's bacillus. Even some strains of the diphtheria bacilli may show yellow colonies instead of cream-coloured growths. On ordinary agar, as a rule, growths are slow and colonies small, even after twenty-four hours' incubation. The growth, however, was much richer on glycerine agar—5 to 7 per cent., and show all the characteristic granular appearance and irregularborders. On glycerine agar tubes, smeared with human blood, the red colour is changed by the diphtheria bacilli, while Hofmann's bacilli do not alter the red colour; in fact, the members of the diphtheroid group do not possess this hæmolytic power.

The growths on blood agar were not unlike those obtained in the case of staphylococcus pyogenes, viz., a yellowish laked zone and round colonies. On being tested the growths were markedly acid producers.

A bouillon with a + 1 reaction becomes a + 2·5 to + 3 in about 35 hours. In peptone water indol reaction was given with or without addition of nitrite.

This reaction is said to be due to the presence of skatolecarboxylic acid. Glucose broth becomes strongly acid in 24 hours. No acid produced in lactose broth. The pseudo-diphtheroid group, Hofmann's and xerosis, produce alkaline reaction in these media, while B. septus is slightly acid.

Swabs from the throats of the dairy workers were obtained and similarly incubated as above, but in no case did I find bacillus of diphtheria. It is surprising what a large number of even healthy people harbour the Hofmann's bacillus; probably 10 per cent., while 1 or 2 per cent. harbour the granular types; of these 1 in 5 may be virulent to the guinea-pig. Direct examinations from swabs may be possible in about 30 to 35 per cent. of cases without incubating, but in these examinations the heat fixed film should be covered with a 20 per cent. solution of acetic acid for a few minutes, which greatly helps to clear up the details of the bacilli in smear Wash off acid and dry with fluffless filter paper and dry in air. All smears are better dried in air before fixing in heat. The bacilli stain more uniformly with such stains as Neisser, Toluidin blue or Gram, and are not so apt to be clubbed. The routine method adopted where there is any doubt is to stain—

(1) With Löffler's alkaline methylene blue, 2 minutes.
(2) Gram stain, but not to decolourise too far.
(3) Neisser's stain.
(4) Neisser's *modified* stain, which gives even better results than Neisser stain.

With Löffler's the picture is very characteristic of B. diphtheriæ, the polar bodies showing intense blue spots.

With Gram stain great information is obtained, as this stain helps to clear up any confusion which may exist in regard to the masses of cocci lying about, which may be mistaken for barred or segmented diphtheria bacilli. It also shows us that the diphtheria bacillus and the pseudo-diphtheria bacillus are the two small Gram positive bacilli found in the mouth. With Neisser we have the characteristic bright blue dots at either end of light brown yellowish rods. Neisser modified, however, gives a better background.

The Klebs Löffler's bacillus of diphtheria in microscopical preparations of diphtheric membranes or cultures on artificial media is a non-motile, rather slender curved rod of variable length—the relation of breadth to length not exceeding 1 to 4, although it may be less. It is Gram positive, but loses its colour by acid alcohol in the Gram-Gunther staining method. It does not form spores. It shows irreguarities in staining, such as beading or banding, and, in particular, deeply stained dots at either end (meta-chromatic granules). These granules show well in an 18 hours' culture, very abundant in 36 hours culture, and are best seen with Neisser's stain. In older cultures clubbing and involution forms are well seen. Parallelism is a characteristic feature, four or five bacilli lying side by side like palisades. They may also show V shapes, or false branching. The remarkable multiplicity of forms in old cultures, such as round rods and long attenuated bodies swollen in centre, and excessively club-shaped rods, is certainly typical of true diphtheria. It is not killed by drying. Retains its virulence for months in dust. It is aerobic and faculative anaerobic, its thermal death-point being 58° C.

Diphtheroid Bacilli.—These are bacilli resembling in some respects the true diphtheria bacilli, and are not infrequently met with in pathological as well as normal conditions. They may be found in wounds of domestic animals, and in various organs of the human subject. Hofmann's bacillus may frequently be isolated in various anginal conditions in the human subject. Almost pure cultures are found occasionally in scarlet fever throats; they are frequently associated with streptococci or staphylococci. They are short rods tapering at both ends, 1.5 μ to 2 μ long, often occurring in pairs, non-motile, Gram positive, no metachromatic granules; polar staining and segmentation do not occur. The parallel grouping is similar to the true diphtheria bacillus. Involution forms not met with.

In culture with this organism the cream-coloured colonies obtained on agar and gelatine can hardly be distinguished from those of true diphtheria, but appear somewhat larger. On alkaline potato the cream-coloured colonies produced are visible on third day of incubation.

Another organism strikingly resembling B. diphtheriæ is the B. septus, found in post-nasal pharyngitis of colds. It is Gram positive, but does not show granules with Neisser's stain. Segmentation may be observed with other stains ; it appears as short ovoid rods, staining at polar ends, no club forms, forming profuse white opaque growth on agar raised and ringed centre. The white colonies on blood agar tend to coalesce. The reaction is slightly acid to glucose, lactose, saccharose, and maltose broth. The organism is frequently associated with catarrhal conditions of nose, throat, and pharynx.

B. Xerosis.—Is another organism of the diphtheroid group, closely resembling in morphology and in staining reactions the B. diphtheriæ. It is found in follicular conjunctivitis, and said also to be found in many normal conjunctivæ. Growth is slower on blood serum, minute and almost colourless even in thirty or forty hours' incubation. Difficult to grow on agar, rarely on gelatine, no granules with Neisser's stain, rods short, club forms, involution forms frequent. In old cultures banded forms of bacilli are not infrequently seen. Alkali produced in glucose, lactose, sacchrose, and maltose broths.

The various waters on farm, to which the cows had access, were examined bacteriologically, but with negative results. In endeavouring to arrive at a correct diagnosis of the presence of B. diphtheriæ, and to distinguish it from the pseudo-diphtheria group, it would be well to observe the following points :—

1. Appearance of growths on Löffler's blood serum.
2. Results of stains with Löffler's methylene blue, Gram, and Neisser.
3. Non-motility in hanging drops.
4. The parallel grouping characteristic of true diphtheria.
5. Absence of spores.
6. Presence of clubbing or involution forms ; none with Hofmann's.
7. Reaction of young cultures, showing granules with Neisser.
8. Bacilli longer than Hofmann's.
9. Forms acids with glucose, Hofmann's does not ; segmentation marked, not so marked with Hofmann's.

Just before and during the outbreak of diphtheria the weather was sultry and dry, and one of the three byres, the east one, was invaded with myriads of flies, which settled on the bodies, udders and teats of cows, greatly annoying them. The walls of the byre were simply black with this pest. The reason why this particular byre was so infested was that the middle and west byres, which ran parallel to one another, had covered sheds and sliding doors at their entrances, but no such structural arrangement existed at the east byre, whi facilitated the entrance of the flies. Unfortunately, shortly before outbreak, the sewage tank overflowed in the vicinity of these byres, and in the semi-solid pool of sewage enormous numbers of flies deposited their eggs. The flies came directly fro mthe pool, settled on the bodies, leaving excreta on udder, teats, etc., which at next milking was taken down into pail with hands of milkers.

The cows of this byre and middle one were always milked first, and the milk despatched to the district in which the diphtheria occurred. The cows in west byre, into which no flies obtained an entrance, were the last to be milked, and this milk only was used by officials on the farm. No case of diphtheria occurred amongst those using this milk; every case of infection was entirely among the customers who obtained the milk from the east and middle byres of this dairy.

After the isolation of the organism from the milk of these two byres, I had all the milk at each milking put in tins, placed in a large iron vat covered with iron lid and felt, into which steam was injected from below, raising the temperature to 185° F. for a minute. The milk was then cooled down and despatched to the various customers. The sewage tank was filled with earth, which at once stopped the fly plague. After these measures were taken not a single further case of diphtheria occurred in the district, and up till now, four months after, no fresh cases were reported. I was unable to test the virulency of the growths on guinea-pig, no facilities being available for such biological test.

An epidemic of diphtheria or typhoid, when due to the milk supply, will exhibit the following features, as this outbreak has done:—

(1) Outbreak sudden.
(2) Many attacks occur together.
(3) The larger proportions of householders will have a common milk supply
(4) Incidence of disease falling on the principal consumers.

Clinical Cases.

BY A. PAYNE, F.R.C.V.S.,
Weybridge.

A REMARKABLE FRACTURE.

UPON the evening of Sept. 13 I received an urgent call to a horse six miles out, the only particulars given being that the animal was in great pain in one of his hind legs.

I found my patient in the stable yard of an inn (a bay cob about

10 years old), showing symptoms of distress, and resting the near hind leg with the toe just touching the ground.

Upon manipulation a crepitus was plainly discernible, and a rectal examination demonstrated a badly fractured pelvis.

The pony was a fairly well-known trotter and, the owner being away, his man was exercising him in a light governess car. He informed me the pony was going at the rate of 10 or 12 miles an hour, when he went suddenly dead lame. It seems incredible, but the poor animal was "walked about 200 yards to the stable yard."

I asked the knackerman to send me the fractured bones, and when they arrived I found the left innominate bone in five pieces and the right completely fractured at the shank of the ilium.

JAUNDICE IN THE DOG.

AIREDALE puppy, nine months old, in fair condition.

Had been listless, with no appetite, and occasional vomiting for the last three days. I saw the case first on Oct. 2nd, about 7 p.m. After examination, etc., informed my client that in my opinion the dog had eaten decaying animal or vegetable matter, and was suffering from a slight toxæmia and gastric catarrh.

Prescribed—

Bismuth Carb.
Sod. Sulphi. Carbol. a a .. .. ʒ ij
Aquae .. .. ℥ vi
M ji

ʒ ij t. d. 3.

Diet.—Administer milk and lime-water, and white of egg and lime-water, alternately every two hours.

Two days later I heard from my client that the dog was about the same, but she had noticed that the gums and mouth were very yellow; this no doubt had escaped me, as I saw the dog by artificial light.

I called the following day and found the tissues stained yellow, and the dog showing the characteristic facial expression I have always associated with jaundice. No symptoms of distemper were present, and as far as the owner knew the dog had never suffered from that disease.

I did not change the treatment, but directed that moist heat should be applied round the region of liver and stomach every four hours for ten minutes. Three days later the patient was decidedly better. Sickness ceased, and liquid food was taken voluntarily.

He eventually made a good recovery.

Fox-terrier dog, 5 years old, in poor condition.

The dog had been ill for a week, with intermittent sickness, intense thirst, attended by the frequent passing of small quantities of a semi-fluid light brown fœces. For four days the dog had taken no food, with the exception of small quantities of milk, which was returned.

Symptoms.—It is unnecessary to go into details, but the skin and mucous membranes were stained a deep yellow ; also the hair inside the thighs and abdomen with bile in the urine.

The temporal muscles were wasted, and the facial expression was haggard to a degree.

The same treatment was applied here as in the former case, with addition of Morphia gr. $\frac{1}{8}$ and Acid. Hydrocyan. Dil. m ij. On the third day there was a slight improvement, which was maintained till recovery took place a week later.

I must own that I have since fancied that Sod. Sulpho. Carbol. exerted some influence in cutting short the career of the disease in both these cases, as hitherto I have lost the majority of my cases of jaundice.

Of course, I quite realise that the cause of the jaundice in both cases was shrouded in mystery, as neither apparently was of the enzootic form, and as the dogs both recovered it was not due to structural hepatic disease.

We therefore conclude that the cause was some influence preventing the onward flow of bile, which consequently was absorbed by the blood.

The most feasible and likely cause would be either some obstruction existing in the neighbourhood of exit of bile duct in the duodenum, or bacterial or allied material propagating in the bile itself.

This invasion, in my opinion, is more likely to occur from the intestinal canal. We know that dogs will eat filth at times, and it is more than probable that frequently certain pathological organisms exist in this material, which, if the animal's defence is weakened from any cause, will have its effect.

Sulpho. Carbolates are recognised as intestinal disinfectants, and are used extensively in the States in intestinal diseases of swine.

WHAT WAS THE MALIGN INFLUENCE?

DURING the last three weeks at a farm in my district fourteen heifers have calved. Of these, six gave birth to full time dead calves, including three cases of Dystokia. A shorthorn and Dexter gave birth at normal period of gestation each to a "mummified" fœtus which apparently died in utero at about five months. Both these heifers were bulled by the same Dexter. I have made enquiries, etc., but cannot find any cause for these casualties.

INTERESTING CASE OF SAND COLIC.

In the *Veterinary Journal* of Dec., 1916, was a translation of an interesting and instructive article on Sand Colic (F. Friez).

The author states that he has investigated 58 cases in three months, that the largest quantity of sand found was 26½ lbs., and that there was never any sand in the cæcum.

In 1915, I had under my care a number of Army horses stationed near my house on a private estate where it was impossible for them to get any sand.

Three animals were attacked with colic at different times within a period of three weeks. The symptoms presented were identical with those described in the translation, and all cases passed sand during the attack which was of a dark grey colour.

One eventually died, and a *post-mortem* examination was made in company with a colleague, which revealed the following :—

A misplacement of the pelvic flexure. The first and second portions of the big colon were packed with sand extending just round the pelvic flexure where the misplacement occurred.

The cæcum also was *packed* with sand and ingesta.

There was general septic enteritis of the big intestine, the mucous membrane being considerably thickened. The sand was dark grey and gave off a strong septic odour. The sand collected weighed about 90 lbs.

The body was fairly well nourished, and the stomach contained a quantity of food. The horse had been at duty the time he had been in the unit, prior to which I could obtain no history. Water was supplied from the main, and the surface soil was not sandy.

Abstracts.

THE SCABIES PROBLEM ON ACTIVE SERVICE.*

By Major H. MacCORMAC, M.D., F.R.C.P.
(Royal Army Medical Corps)
AND
Captain W. D. D. SMALL, M.D., F.R.C.P.E.
(Royal Army Medical Corps).

Every man incapacitated from duty—it matters not by what means—is a gain to the enemy. From the point of view of the Army and of military efficiency those diseases ought to rank highest in importance which cause most "casualties." Judged from this aspect, diseases of the skin occupy one of the premier positions, for under the conditions of trench warfare it is inevitable that they are met with in large numbers. The exact extent of the wastage for which they are responsible is known only to the authorities, but it is apparent to all that, since many are contagious, successful efforts directed towards prevention and cure will amply repay by a very large gain of fighting men.

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* Journal of the Royal Army Medical Corps.

Of the skin diseases found amongst soldiers—excluding pediculosis—scabies is by far the commonest. When uncomplicated, its effects incapacitate a man but little; but in consequence of the hard conditions of active service secondary pyodermic complications are frequent and severe, and these are a very real cause of prolonged sickness. In contrast to the three or four days required for the complete cure of a simple case, we have found that when pyodermic complications are established the period necessary is greatly prolonged, the average stay in hospital over a large number of cases being 31·67 days. It should be explained that this figure does not include either treatment elsewhere—which sometimes amounted to many weeks—or the days spent in journeying to the base.

Scabies as seen amongst soldiers, differs in type from that usually met with in civil practice, and unless the differences are appreciated many cases will not be recognised, leading to dissemination by undetected "carriers." The eruption is distributed much in the usual fashion, the sites of election being the wrists, hands, penis, lower abdomen, anterior axillary borders, elbows, and buttocks. The characteristic interdigital burrows, however, are but rarely seen; they were present typically in only thirteen* of our cases. Vesicles are much more common, though in quite a number of cases the hands are entirely free from lesions of any sort. A correct diagnosis can only be made after inspection of the whole body. In the majority of cases the penis is involved, and the discovery of papules or crusts on either skin or mucous membrance is almost pathognomonic. This serves in doubtful cases to distinguish scabies from the acute pediculosis so frequently seen, and is for this reason an extremely useful diagnostic symptom.

Besides the primary lesions of scabies, others due to secondary coccal infection are common and important. They may be so severe as to mask the primary disease and render it liable to be overlooked. Most common is a variety of impetigo distributed in a characteristic manner on the lower buttocks, elbows, and knees. The presence of pustules or crusting on one or all of these regions should at once suggest scabies and lead to search for the more primary lesions elsewhere. Occasionally the impetigo becomes very widely spread, but even in such cases a correct diagnosis can be made by observing the characteristic grouping on the regions indicated. In numerous cases the impetigo lesion extends more deeply into the dermis and takes the form of an ecthyma. Occasionally a linear variety of impetigo is present.

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*This figure does not include cases where one or two indefinite lesions could be found after prolonged search: including these the percentage would be about 45. It is our impression that lately burrows have been observed with more frequency than some months ago.

Boils and other follicular infections of the skin are frequent, and tend to recur indefinitely so long as the primary scabies remains uncured. No case should be considered as one of simple furunculosis until itch has been carefully sought for and excluded—or, if found, until the patient has had a thorough course of sulphur treatment.

Some degree of adenitis is the rule in all cases of scabies which have developed any form of coccal infection. The glands of the groin are those most frequently involved, and suppuration in this situation forms a not uncommon and often troublesome complication. In the upper limb severe lymphangitis with foci of suppuration seems to constitute the corresponding lesion. These septic foci usually occur in the upper third of the limb, and on its inner aspect.

Dermatitis as a complication of scabies is most frequently the result of unsuitable, misapplied, or too long continued treatment. In these instances the abdomen, thighs and arms are the commonest sites—and all degrees from simple erythema to moist weeping or exfoliating eczema may be observed.

Subjects of the seborrhœic diathesis seem particularly liable to this complication.

Localised dermatitis may originate in a group of vesicles or other scabetic lesions, which, together with the intervening skin, have become irritated by scratching; considerable local thickening of the skin becomes superadded and the result is an area of chronic infiltrative dermatitis—in part scabetic and partly artefact. This is most commonly seen in the flexure behind the knee or on the outer aspect of the thigh.

In its diagnosis, scabies must not only be distinguished from the pyodermic conditions apt to be associated with it, but also from pediculosis, pompholyx, syphilis, and an unusual papular urticaria.

From pediculosis, the diagnosis is chiefly made by the difference in distribution, and the absence of infection of hands, wrists and penis. Not only may the two conditions be associated, but the papule* common to both, can only be distinguished with extreme difficulty.

The vesicular lesions of pompholyx are much more deeply seated, more numerous, and more difficult to rupture than those of scabies, and are chiefly limited to the hands and feet.

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* Pediculosis as usually seen in France occurs in an acute form and characteristically presents a papular type of eruption.

A single large scabetic lesion on the penis may give rise to question as to whether or not the patient is suffering from venereal disease, and the eruption on the body may be mistaken for a secondary rash ; the diagnosis is not always so easy as might be supposed, particularly if risks of venereal infection have recently been incurred. Here also the two conditions may occur together.

A type of papular urticaria which we have not observed in civilian practice may simulate scabies very closely. In this condition, small red papules occur over the body generally but particularly on the abdomen and anterior axillary folds ; wheals, or some degree of dermographia, may often be found or induced. Again, the wrists, hands, or penis are not involved, and the disease tends to disappear suddenly, while relapse is frequent.

The methods of combating scabies fall under the two headings—prevention and cure.

(*a*) *Preventive Measures.*—Scabies it is generally accepted is rarely contracted excepting after prolonged and intimate contact with infected material, the acarus does not wander afield like the louse. This being so it is difficult at first sight to explain how the soldier gets the disease. His opportunities for removing clothing and coming into contact with an infected medium are few and are only fully possible when in rest. All the evidence—particularly the occurrence of epidemics amongst officers sleeping in the same dugout, or amongst groups of men quartered together—points to blankets as the chief means of disseminating infection. Prevention then should include frequent disinfection of blankets by such a method as the Clayton sulphur vapour apparatus, or some other accepted form of sterilisation. A few cases seem to be contracted from horses, and the protection of the soldier therefore includes efficient treatment of the horse. Great stress is laid by French writers * upon the venereal origin of scabies, and this possible source of infection requires to be kept in mind.

Of the greatest importance is the early detection of every case of scabies. Each case undetected acts as a "carrier," and is the potential starting point of an epidemic. Frequent and thorough inspection of the individual soldier is the only means whereby early diagnosis can be assured. Infected men should be segregated and treated as speedily as possible, for—in addition to preventing dissemination—early diagnosis enables treatment to be instituted while the disease is still uncomplicated, and rendersd its course short—correspondingly conserving man-power.

(*b*) *Curative measures* should include exposure of the parasite and its ova and their destruction by remedies short of producing dermatitis.

The subsequent disinfection of clothing and bedding to prevent reinfection must never be omitted.

Sulphur, it is generally acknowledged, is the most efficient remedy for the treatment of scabies—and certainly by reason of its procurability and cheapness it is that most suited for the extensive requirements of an army. It is a remedy, however, which requires careful and intelligent application, and care must be taken that the patient receives neither too little nor too much treatment—the former leaving him uncured, the latter producing dermatitis, and so increasing his period of unfitness. How this remedy should be employed is already so well known that a repetition of the details would seem unnecessary had it not been for the recent reintroduction of the sulphur vapour method. This form of treatment, so scathingly condemned by Hebra† in the first half of the last century, seems to have again obtained vogue, in spite of the fact that it was so completely discredited nearly a hundred years ago. Indeed, it has so long been regarded as one of the barbarities of the Dark Ages that it is rarely mentioned in modern text-books. We have had opportunity of noting a number of cases treated by this method. Some have suffered from severe dermatitis, numerous others have been uncured. The history given by some of these latter is instructive. After the vapour treatment, the itching was relieved, and improvement appeared to take place in the eruption. The patient seemed cured, but after a period of about two weeks the disease again became active, so that it would appear that in these a false sense of security had been obtained and a "carrier" discharged to further disseminate the infection. That a certain number of cases may be cured by this method is probably correct, but its uncertainty and the special danger of dermatitis, from which it is inseparable, give us no option but to emphatically condemn its use.

Liquid preparations of sulphur, such as Vlemingx's solution (liquor calcis sulphurata) are undoubtedly efficient agents for the cure of scabies, but they are also particularly liable to cause dermatitis, and considerable experience is necessary for their satisfactory employment.

For its simplicity and certainty, no method is so suited for general use as that of simple inunction with sulphur ointment (B.P.), and admirable results will invariably be obtained, if the treatment is conscientiously carried out with due regard to the necessary detail It must, however, be insisted that the method of application is of parmount importance. This may be briefly outlined as follows :—

(1) On the first day of treatment, the patient is given a hot bath, and provided with plenty of soft soap, and a large, moderately stiff nail-brush.

(*a*) Before entering the bath, he rubs himself thoroughly all over with the soap, massaging it into the skin, and paying particular attention to the fingers, toes, wrists, penis and axillæ. This should be continued for at least ten minutes.

(*b*) He then enters the bath, which should be both long enough and contain a sufficiency of water to permit of immersion to the neck. After first steeping for fifteen minutes, he scrubs himself vigorously all over with the nail-brush for the purpose of opening burrows and vesicles. In cases where the eruption is particularly severe or painful, this part of the procedure may be correspondingly modified. After the bath, a final inspection should be made, when any unruptured vesicles can be opened with a surgical needle.

The bath is given with the sole object of opening up the haunts of the acarus and exposing it to the action of the parasiticide to follow. It is obvious that shower or steam baths cannot fulfil this purpose, and examination of a patient so treated will reveal the burrows and vesicles still intact.

(2) After removing the soap and drying, a liberal quantity of sulphur ointment (B.P.) is provided, with which the patient rubs himself vigorously all over, from the neck downwards, special attention being paid to the affected parts and to the fingers, wrists, genitals, axillæ, toes and ankles. The ointment must be liberally applied and thoroughly rubbed in, so that when finished he should be literally "soaking" in it.

The inunction is to be repeated in this manner twice daily for three days—*i.e.* until the patient has had in all six applications. Each must be complete, and for this it is obvious that all clothing be first removed. The treatment of limited parts of the body is useless.

(3) Finally, on the fourth day, but not before, a second bath is given and all the patient's clothing and bedding sterilised to prevent reinfection. Even such articles as wrist straps, strings of identity disks, gloves, etc., should be included.

The vast majority of cases, unless there be secondary complications, will be found cured after three such days of treatment. Should any doubt exist, 2 per cent. beta-naphthol in vaseline may be used daily for four more days. Only under exceptional circumstances should sulphur ointment be applied for more than three days, since its continued use is liable to cause severe dermatitis. Indeed, insusceptible persons, a mild degree may be occasioned by the three-day treatment. This is usually easily cured by zinc ointment or Lassar's paste. At the completion of treatment, the existence of some degree of itching is not uncommon; this is due to the remedy and does not indicate failure of cure; it will rapidly pass off, and should be disregarded. Some days also will probably elapse before all the lesions of scabies have disappeared, although the man is no longer infective. A certain degree of pigmentation may persist indefinitely.

CONCLUSIONS.

(1) Scabies in soldiers differs in type from the ordinary form of civil practice, particularly in the frequent absence of burrows or other lesions upon the hands, and in the great liability to pyodermic complications.

(2) The primary disease is often masked by complications. In every case of impetigo, boils, dermatitis or inguinal adenitis, scabies must be carefully excluded before the diagnosis is considered complete.

(3) Cases of scabies complicated by any of the above necessitate about ten times as long a period in hospital as do simple cases. Therefore early diagnosis and treatment, before secondary diseases have become established, are of the greatest importance.

(4) Regular medical inspection is essential for the detection of "carriers." Infected men should be segregated and treated at the earliest opportunity. Horses may also require inspection. Blankets, being the chief source of spread, should be sterilised as often as possible.

(5) Treatment by means of sulphur vapour is a method harmful often to the patient, and at all times dangerous to the community in that it manufactures a class of scabies "carrier." In the interests of the Army it should be discontinued.

(6) The method of treatment most suitable to service conditions on account of efficiency, simplicity, and cheapness, is inunction with sulphur ointment, but this must be carried out in a methodical and thorough manner, and with careful attention to the necessary details.

REFERENCES.

[*] MILIAN. *Paris Medical,* May 6, 1916, page 426.

[†] HEBRA on "Diseases of the Skin" (New Sydenham Society), ii, p. 241.

† Pediculosis as usually seen in France occurs in an acute form and characteristically presents a papular type of eruption.

THE COMPOSITION AND VALUE OF SOME OF OUR COMMON VEGETABLES.*

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THE vegetables commonly used at our tables may be divided into the following general classes :—Tubers, roots, bulbs, green vegetables, vegetable flowers, fruits, legumes, and cereals.

Tubers and roots play an important part as table vegetables—e.g., potatoes, Jerusalem artichokes.

Of tubers, potatoes take first place for home consumption. They owe their food value to the carbohydrates (starch) they contain. Jerusalem artichokes also form a valuable addition to the diet.

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Of roots, the sweet potato (largely used here) is rich in starch and sugar, on which its food value depends. It has a slightly higher feeding value than ordinary potatoes. Carrots, parsnips, radishes, salsify, scorzonera, turnips, and beets are also largely used.

The most common of the bulb-bearing plants are leeks, onions, shallots, and garlic. Of these the onion is most largely used as a table vegetable.

Amongst green vegetables, of which the edible portion is the leaves or leaf stalks, we have cabbage, brussels sprouts, lettuce, spinach, celery, cress, etc They all contain large quantities of water, generally over 90 per cent , so that they have little food value. They tend to get hard and woody on approaching maturity, so that, like roots, they are best when used in the young, tender state.

In the cauliflower and globe artichoke the edible portion consists of the inflorescence, or part thereof, much altered by cultivation, etc.

Legumes.—Of these, beans and peas are most commonly used for human consumption.

In the early part of the season green beans in the pod are used, when they are valuable for their succulence. They contain a high percentage of water, and have not a high nutritive value. Later, when shelled, the dry seed when cooked is a valuable and nutritive vegetable, containing a high percentage of nitrogenous matter and starch.

Peas, generally used in the shelled green condition, also form a valuable addition to the diet.

Rice and Mealies are the only cereals used as vegetables in South Africa. They are poor in nitrogenous, flesh-forming materials and also in fat. Although in this respect mealies are richer than rice both are valuable for their starch, and must be combined with foods rich in nitrogen and fat to furnish an economical diet. Mealies are also used, cooked, in the unripe condition, and in this state they are succulent and generally relished.

Tubers.—Jerusalem artichokes (*Helianthus tuberosus*) is a tuber-producing plant belonging to the sunflower family. The edible portion consists of these underground tubers, and their principal food value lies in their carbohydrates. The principal part of the carbohydrates in artichokes consists of inulin, so that, in this respect, they differ from potatoes, where it is principally starch. In composition they contain about 80 per cent. of water. Their carbohydrates, the principal food constituent, amounts to 15–17 per cent. In proteid or flesh-forming material they are lower than potatoes, but otherwise there is not much difference between them and potatoes, both forming a valuable source of carbohydrates in the diet.

TABLE SHOWING APPROXIMATE COMPOSITION OF DIFFERENT VEGETABLES AS USED AT TABLE.

Analysis of Samples as used.

	Water.	Proteid.	Fat.	Carbo-hydrates.	Fibre	Ash.	Sample.
	%	%	%	%	%	%	
Artichokes	79·50	1·98	·20	16·78	·72	·82	1
Beet	86·75	1·49	·12	8·74	·97	·93	4
Carrots	88·59	1·28	·45	7·39	1·30	·99	6
Parsnips	83·06	1·51	·58	11·85	1·92	1·08	2
Radishes	90·95	1·22	·09	6·31	·65	·78	5
Turnips	90·51	1·24	·18	6·10	1·16	·81	4
Onions	86·98	1·72	·31	9·40	·96	·63	3
Dwarf Bean (green in pod) ..	84·61	2·68	·34	9·14	2·34	·89	2
Lima Bean (green shell) ..	71·82	6·38	·58	18·43	1·59	1·24	2
,, dry)	12·10	23·65	1·28	56·25	3·24	3·48	1
Broad Bean	11·55	24 99	1·56	53·42	5·27	3·21	2
Peas (green)	76·95	4·45	·42	14·86	2·33	·99	3
Peas (dry)	13·32	25·70	1·51	52·22	4·18	3·07	3
Mealies (green)	72·59	3·98	·56	20·67	1·36	·84	2
Cabbage	89·18	1·56	·39	5·37	2·43	1·07	1
Asparagus	94·01	1·59	·21	2·70	·68	·81	2
Lettuce	92·66	1·35	·34	3·49	·82	1·34	1
Potatoes	76·29	2·21	·13	19·94	·34	1·29	4
Sweet Potatoes	70·36	2·04	·87	24·31	1·33	1·9	3
Mealies (as used)	66·90	3·14	1·22	27·64	·37	·73	1
Rice (as used)	70.16	2·41	·20	26·71	·22	·30	1

Potatoes.—The potato (*Solanum tuberosum*) belongs to the botanical family *Solanaceæ*. It is one of the most important of our vegetables. The best potatoes are grown in loose, lightish soils where the roots of the plants penetrate easily, and where the soil is of a yielding nature and allows the tubers to develop properly.

Stiff, clay soils are unsuitable for the best quality potatoes. On suitable soils it is one of the cheapest vegetables to grow, and also one of the easiest ones to keep, so that at present it is one of our most important food crops.

The stage of growth, treatment, soil, etc., affect the composition of the potato tuber. Young, immature potatoes are more watery than fully developed tubers, but the average water contents of the potato is just under 80 per cent.

About 17–20 per cent. of the tuber consists of starch, togetehr with very small quantities of sugar, also a very small amount of nitrogenous substances, generally ranging from 2·2–2·4 per cent., but of this not more than half is in the form of true protein, flesh-building material.

The fat or other extract in potatoes exists in very small quantity, and as it is present in largest proportion in the outer layers very little of it is utilisable for food purposes when potatoes are peeled before cooking.

The most important of the mineral constituents of potatoes are their potash and phosphoric acid, which together amount to about three-quarters of the total ash. The potash alone amounts to about three-fifths, or 60 per cent. of the total ash, which shows the importance of liberal manuring with this fertiliser for the crop. Soda salts, lime, magnesia, silica, chlorine are also found present.

The potato, then, is valuable principally for its carbohydrates These average in round numbers 18 per cent. The fibre or cellulose, of which the cell walls forming the framework of the tuber are composed, amounts to about 4–5 per cent It is therefore essentially a starchy food, but it also contains small quantities of soluble carbohydrates and sugar. The quantity of sugar is relatively greater in young, immature potatoes than in mature main crop varieties which are left to ripen before using. Being a starchy food they are best used with foods rich in protein, such as meat, fish, etc. Potatoes also contain solanin, an alkaloid characteristic of plants belonging to the potato family. This substance is poisonous.

Normally, in potatoes, especially in mealy varieties of the main crop, solanin is present only in very minute quantities. Small and unripe potatoes contain more. Potatoes which have been exposed to the light and turned green also may contain considerable quantities of this poisonous substance. Also, when potatoes get old and have been allowed to sprout in store, the acrid taste so often developed is due to their higher solanin content, and in such old shrivelled potatoes considerable amounts of solarin are sometimes found. This solanin is found in the parts of the tuber where changes in the composition, due to active growth, are greatest—i.e., in the flesh around the eyes and sprouts.

Dried Potatoes.—Attempts have been made to put potatoes on the market here as stock feed in the form of sliced dry potatoes and as potato flakes. They may be sliced and dried directly by heat in a kiln, or they may first be steamed and then pressed between rollers heated with steam and thus pressed into thin flakes. In either form they are generally first moistened and then mixed with chaffed straw, and in this condition are readily eaten by stock. Dry potatoes and potato flakes are the results of attempts to get the potatoes in a compact form, in which their keeping qualities are greatly improved, as the drying stops the action of bacteria which cause decay of the tubers stored in the natural state. Potatoes treated in this way can be stored without fear of deterioration. It takes about 400 lb. of tubers to yield about 100 lb. of the dried product, so that the dried material has a much higher feeding value than the untreated potatoes, and is equal more or less in composition to cereal foodstuffs with a water content of 8–10 per cent.

Potatoes have also been largely used in Germany for the making of alcohol for industrial purposes. The potatoes used for this purpose are not table varieties, but are the result of systematic experiments to produce potatoes as rich as possible in starch and other fermentable material. The tubers are much coarser than table varieties, but are much richer in starch and sugar.

To get profitable returns to farmers and manufacturers the crop must be grown on a large scale, and must be of varieties containing large quantities of starch and fermentable matter.

Potatoes are also much used in Europe for starch manufactures, as potato starch is very valuable in the textile industries.

At the present time in South Africa potatoes are grown mostly for table use, and only the injured and small are used for stock feed. There still exists on the part of farmers a certain dislike to feeding raw potatoes to stock, due to the fact that when injudiciously fed they are liable to cause colic and diarrhœa. These results are only found when potatoes are used in too large quantities and for a long time. Some soothing food like linseed should be fed with them, and not foodstuffs with an irritating effect such as silage and brewers' grains. They should also be added gradually to the ration, and they should be stopped gradually. Only sound ripe tubers should be used, and not sprouting potatoes. For pigs the potatoes should be cooked or steamed, as raw potatoes are not suited to their requirements. When dried potatoes are used as pig feed they are either scalded or soaked in skim milk or whey. There is little doubt that it would make a considerable difference to the profits from potato growing if a potato-drying industry were started, rather than that farmers should have at certain seasons to force their products on an unprofitable market.

Sweet Potatoes (Ipomœa batata).—This plant belongs to the *Convolvulaceæ.* It is very generally used in South Africa as a vegetable, and thrives best on soils of the same character as the ordinary potato is found on—viz., loose, light soils and light loams that are sufficiently supplied with organic matter and plant food for the use of the growing plants. In such soils the roots develop well and are even in quality and of good shape.

In the sweet potato the edible underground portion is a true root, not a modified stem as in the ordinary potato, although it takes practically the same part in the life history of the plant. The sweet potato is propagated almost exclusively by means of shoots or slips, and sometimes failures are due to planting in a similar manner to that adopted with the ordinary potato. Either hibernated slips from the previous season are planted or shoots obtained from sprouted sweet potatoes planted some ten weeks earlier.

Desirable qualities in sweet potatoes :—

The roots should be chunky rather than excessively long and thin.

Also, firm, fresh-looking samples, smooth-skinned, and of medium size are preferable to very large or very small roots.

If sweet potatoes are put on the market before they are mature they can generally be recognised, as a cut surface turns greenish black round the edge, also a milky juice sometimes exudes from immature sweet potatoes, which turn black on exposure to the air. Such potatoes are not sufficiently mature.

In their chemical composition and food value there is a considerable similarity between the sweet potato and the ordinary potato.

Sweet potatoes contain more dry matter and less water than ordinary potatoes, with a corresponding increase in their carbohydrate content.

The carbohydrates in the sweet potato differ from those in the ordinary potato in containing considerable quantities of sugar, principally as cane sugar.

South African-grown sweet potatoes average 4·6–6·6 per cent. of sugar, but the amount is found to vary considerably. They also contain 20 per cent. or more of starch, so that compared with ordinary potatoes they are richer in carbohydrates.

Their content of crude fibre is higher, and they also contain more fat or other extract, but their proteid content is lower than in the ordinary potato.

There is thus very little difference in nutritive constituents between the sweet and the ordinary potato, although as a heat, fat, and energy producing food it is more valuable.

The sweet potato is also a cheap vegetable to grow, and merits a more extensive use as a table vegetable than is at present made of it. It might also where sufficiently cheap be fed with advantage to milk cows, as this practice where followed is said to keep the animals in a healthy condition.

Pigs are also very fond of the roots, and can harvest them themselves, though, as with ordinary potatoes, they require to be fed with some flesh-building or protein rich food, such as peas, beans, etc. for the best results. If all the potatoes are not required for food or stock feed the residue might also prove of value for the production of alcohol for industrial purposes.

Sweet potatoes are even more suitable for this purpose than ordinary potatoes, as they contain a higher percentage of fermentable matter, so that, weight for weight, sweet potatoes yield more alcohol than ordinary potatoes.

A yield of sixty bags per acre would produce about 2,700 lb.

of fermentable matter per acre, which would yield about 160 gallons of 93 per cent. alcohol.

Succulent Roots.—Beets (*Beta vulgaris*), garden beets of the red variety, are used to a considerable extent in this country as a table vegetable, though beets of the yellow variety are also sometimes seen on the market.

So far sugar beets when grown in South Africa have been grown principally as a fodder crop, and in the pulped condition form a very useful addition to the ration of dairy cows.

Garden beets on the average contain 87–90 per cent. of water. Their ash and protein content is similar to that of potatoes. The fat is generally lower, often negligible, and they contain 7–9 per cent. of carbohydrate, mostly as cane sugar, wherein lies their value as a food product.

Carrots (*Daucus carota*).—There is a large number of varieties of carrots, but those most commonly raised here for table purposes are of medium size and deep yellow colour.

Like parsnips, they are best when used early, as they tend to become hard and woody and rather strong in flavour when mature. The composition of carrots is practically the same as of beets, grown under similar conditions. They are richer in fat and fibre and with a lower percentage of sugar. They contain 6–7 per cent, of sugar, though the amount is rather variable, depending on maturity, etc.

Parsnips (*Pastinacea sativa*) are closely allied to carrots, and resemble them in properties, appearance, general manner of growth, and soil requirements. They have a much stronger flavour than carrots.

They are richer than beets or carrots in carbohydrates. They are also richer in fat. They contain, however, a larger quantity of crude fibre, so that they show a greater tendency to become hard and stringy if left too long.

Radishes (*Raphanus sativus*).—Those most commonly grown in South Africa are of the small oval or globes varieties, mild in flavour and pink or scarlet in colour, with white flesh.

Radishes are generally used as soon as possible after picking, otherwise fermentation sets in, which changes part of their starch into sugar, so that they become sweetish and lose their flavour and also tend to get flabby and soft.

They are generally eaten raw while still young and immature, as they tend to get pungent and disagreeable in flavour on approaching maturity.

In this young state they contain a higher percentage of water than beets or carrots, generally over 90 per cent., and are very succulent.

Their percentage of protein is very low—lower than beets or carrots—and they are lower than carrots in fat, while their percentage of carbohydrate is also lower, so that all round they have very little food value and are valuable mainly for their flavour and succulence.

Turnips.—The turnips grown in South Africa are mostly of table varieties—spherical shaped and white fleshed. Their flavour makes them also a valuable addition to the diet.

Turnips used as vegetables contain about 90 per cent. of water, so that their nutritive value is not high.

Their principal food value lies in their carbohydrate, amounting to about 6 per cent., and consisting largely of cane sugar, glucose, etc. They are very poor in proteid and fat. In turnips and radishes also, in the state in which they are used as vegetables, only a small percentage of the crude proteid exists as true protein or flesh-forming material.

Bulb-producing Plants.—Of bulb-producing plants, the most important is the onion. All members of this group of plants have a strong odour and flavour. This flavour, as is also true of the plants belonging to the order *Cruciferæ*, is due to volatile organic compounds of sulphur, which are decomposed by heat and are consequently largely lost in cooking. So that cooked onions, like cooked turnips, etc., have a much milder flavour than the raw vegetables. The total crop of onions produced in South Africa is very considerable, and many farmers who are in a convenient position for markets put in large areas. For satisfactory storage the plants must be mature, though for market purposes and immediate use younger bulbs are preferable, as they contain smaller percentages of fibre in this condition.

They generally contain about 85 per cent. of water. They are poor in ash, but in protein they compare favourably with the succulent roots, while their carbohydrate content also compares favourably with root crops.

Shallots are also grown to some extent for seasoning.

Leeks, of which several varieties are grown, are valuable for their leaves, which are used as a green vegetable in soups, etc. These vegetables are closely related to onions, and are valued for similar properties.

Garlic is also closely related to the onion. It is not used here to any extent except by people of South European descent, as is shown rather forcibly by their breath.

PLANTS USED FOR THEIR INFLORESCENCES.

Cauliflower is a variety of cabbage in which the edible portion is the modified and much thickened flower head. It is very largely cultivated and is a most delicious vegetable. Many different varieties are produced, differing in size, earliness, firmness of the heads, vigour of growth, and table qualities, but these differences are largely due to cultivation.

Its chemical composition does not differ very largely from that of the common cabbage. The edible portion contains more carbohydrate and fat, but less fibre and ash. In respect of proteid they are very similar.

Globe Artichokes (Cynara scolymus) is not yet very generally grown as a vegetable in South Africa. For edible purposes the flower buds are used before they are open. While the artichoke is still young and tender it is sometimes used in the raw state. The plant tends here, however, to get hard very quickly, and it has then to be cooked before use. It is grown here either in autumn or spring in well-worked manure land. The stem is generally cut off close to the leaves, and the parts of the flower in the centre and the hard outer leaves are removed before use.

PLANTS USED FOR THEIR LEAVES, SHOOTS, OR STALKS.

Cabbage (Brassica oleracea), of which many different varieties are grown, differing in earliness, solidity, and shape of head, crispness, and flavour.

The cabbage contains generally about 90 per cent. of water. Its fibre content is rather higher than in the succulent roots, but in ash and protein it compares favourably with those root crops.

Brussels Sprouts is a variety of cabbage also grown to some extent. It is generally sown early and transplanted before winter. The composition of brussels sprouts is very similar to that of cabbage, but its fibre content is lower, and it is a much more delicious vegetable than ordinary cabbage.

Lettuce (Lactuca sativa).—Of this vegetable many different varieties are cultivated. It is a very succulent vegetable in the condition in which it is used, and with a very delicate flavour.

Its food value, however, is very low, containing, as it may do, up to 93 per cent. of water. Compared with cabbage it is lower in carbohydrates, but almost equal to cabbage and the succulent roots in proteid.

Asparagus (Asparagus officinalis).—This vegetable is generally used in the young state, and in this condition contains high percentages of water—92–94 per cent. It is lower than other vegetables in ash, fibre, and carbohydrates, but its proteid content is about normal when compared with other succulent vegetables.

Legumes in general use as vegetables are principally beans and peas.

The garden beans generally used fall into two distinct classes—bush and climbing beans.

Each of these general classes may be divided into kidney beans (*Phaseolus vulgaris*) and lima beans (*Phaseolus lunatus*).

Kidney beans are either green podded or butter beans wax podded.

The characteristics of lima beans vary considerably in the habit and growth of the plants and characters of the seed. The types and varieties vary with the purpose for which the beans are grown, as snap beans for early use, for which purpose early growing varieties of green or wax-podded kidney beans are used.

The different varieties of kidney beans vary considerably in earliness, productiveness, tenderness, flavour, and texture of the pods. Some varieties have the pod tough and are not suited to eating in the green condition as snap beans except when very young. These snap beans are generally grown by market gardeners to secure a succession of pickings throughout the season.

Lima beans (role lima beans) are not very common, but there are several varieties of dwarf limas grown in a similar manner to kidney beans. They are valuable as summer vegetables, producing big crops of green beans which have a more delicate flavour than common beans. In the dry state, also, they can be used in practically the same manner as common beans, so that lima beans are of great commercial value as a table vegetable.

Snap beans contain a high percentage of water (80 per cent.), so that they are valuable mainly for their succulent quality, though their proteid content is higher than that in any of the succulent vegetables.

In shelled beans, and especially in the dry beans, the proteid content is high, about 25 per cent., and over 50 per cent. carbohydrate starch, so that they could well replace part of the nitrogen-supplying foodstuffs in the diet—i.e. flesh, etc. Their principal drawback from the food point of view is their comparatively low fat content compared with the other constituents.

Peas are quite as highly valued as beans for human consumption. They are not generally eaten in the pod.

Many different varieties are in use, varying in earliness, productiveness, habit of growth, quality, and flavour. Like beans, they are rich in nitrogenous flesh-building material, richer than any of the roots or tubers, and have a higher food value than those.

Green peas contain about 75 per cent. of water, about 13–14 per cent. of starch and sugar, and are about three times as rich in proteid as any of the root crops.

Green Mealies, when eaten in the unripe state, are very succulent, and when cooked form a very palatable vegetable, much relished in South Africa. In the state in which they are picked they yield slightly more food material than potatoes, but much less than foods like peas or cereal foods. When picked in this condition, however, they are valued more for their palatability than for their actual food value. They contain about 75 per cent. water.

They are richer than potatoes in proteid and fat, contain about the same amount of carbohydrate, starch, and sugar, but are poorer than potatoes in mineral matter. Like potatoes, they contain too little proteid in proportion to their fat and carbohydrates to supply the body with nutritive materials in their proportions.

Dry shelled mealies are also used in the cooked condition for vegetables in South Africa, as is also shelled rice. These are both poor in proteid flesh-forming materials and also in fat, though in these respects mealies are richer than rice. Both are typical starchy foods, and must be combined with foods rich in nitrogen and fat to form an economical diet.

Mealies when eaten in the unripe condition contain more nitrogenous flesh-building material in proportion to their other food constituents than when used in the ripe shelled condition.

Pumpkins are used to a considerable extent as vegetables, etc., in South Africa, and largely as a cattle feed. They are very productive and of high value both for table and stock food, and have good keeping qualities.

There is a considerable variation in composition between the finer garden varieties used for the table and the coarser, larger-growing cattle types.

The garden grown varieties show generally thicker, finer grained flesh with less moisture than the field grown samples, which are larger, with coarser flesh and tending to woodiness. All round they are of poorer quality, and may be compared as follows :—

	Garden Variety.	Field Variety.
Moisture	89·0	91·0
Ash	·6	·5
Protein matter	1·7	1·2
Fibre	1·7	1·8
Oil	·7	·4
Carbohydrates as starch and sugar ..	6·6	5·1

It will thus be seen that the coarser growing cattle pumpkins are poorer feeding all round than the finer growing garden types.

Squashes are very similar to pumpkins, and there are many varieties. They are, however, generally better fitted for table use than for stock feed. Squashes are more nutritive than pumpkins, as they contain less water. They are higher in feeding value than even the garden varieties of pumpkins, but this is due primarily to their lower water content.

	Per cent.
Moisture..	88
Ash	·8
Protein	1·9
Fibre	1·6
Oil	·72
Carbohydrates as starch and sugar	8·31

Cucumbers are largely cultivated in South Africa. They are used generally as salad while still young. In this state they contain a high percentage of water—up to 95 per cent.

They show about the following composition :—

	Per cent.
Moisture..	95·38
Ash	·4
Protein	·87
Fibre	·71
Oil	·16
Carbohydrate, starch and sugar ..	7·87

Water Melons are grown in practically the same way as pumpkins, and, like all plants belonging to the *Cucurbitaceæ*, require rich, warm, and well-drained soil. Though melons often grow to a large size, those of an average size, with firm flesh and good keeping qualities, are preferable, in addition to their standing more rough handling. The water melon as used contains :—

	Per cent.
Moisture..	92
Ash	·31
Protein	·43
Oil	·2
Fibre	·55
Carbohydrate, starch and sugar ..	6·51

The *Mush Melon*, of which there are also a number of good varieties, does not grow to such a size as the water melon, but, compared with the water melon, it contains more nutrient matter, dne to the fact that it contains less water.

As used, the average composition is about :—

	Per cent
Moisture	90
Ash	·6
Protein	·64
Fibre	·78
Oil	·2
Carbohydrates, starch and sugar	7·77

It is therefore considerably higher in feeding value than the water melon.

The *Egg Plant* is also highly valued as a vegetable. It has, however, little nutriment value. It contains about :—

	Per cent.
Moisture	92·5
Ash	·5
Protein	1·37
Fibre	·85
Oil	·18
Carbohydrates as starch and sugar	4·6

Tomatoes, although they do not contain very much nutrient material, are yet one of the most useful and most appreciated vegetables we have.

As tomatoes are used here mostly locally, they are generally allowed to ripen on the vines before picking.

They contain mostly :—

	Per cent.
Water	93·5
Ash	5·7
Protein	1·16
Fibre	·91
Oil	·28
Carbohydrates, starch and sugar	3·58

It can thus be seen that their food value is very low, but, like all succulent vegetables, they have a value far beyond their value calculated as mere nutrient material in their promotion of general health and in the variety they afford at table.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone : Gerrard 4646. Telegrams : " Baillière-Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

INDEX TO AUTHORS.

Aitken, Colonel J. J.—Economic and military necessity of an Army Veterinary Service, 263.
Aveston, Lieut. J. J.—Adenoma of the kidney in a horse, 55.

Baxter, J. R.—Interesting cases, 291,
Bond, P. G.—Tannin and tanning, 284.
Brooke, W. H.—Purpura hæmorrhagica, 373.

"Canis Major."—Few errors in diagnosis and treatment, 371.
Chambers, Major F.—Notes on the treatment of equine specific ophthalmia, 54.
Chaussé, Vet. Major.—On the treatment of lymphangitis in the horse, 111.
Clarkson, M.—Case of staggers in horse, 331.
Cotton, Major Charles E., V.C., —Veterinary service in the American Army, and the duties of veterinarians during the war period, 318.
Country Practitioner.—Intussusception in the dog, 86.
Cross, H. E.—Note on jhooling in camels, 17, 18.

Ditewig, George.—Meat-inspection service of the United States Department of Agriculture, 415.

Eve, Henry B.—Clinical cases, 253; Hepatic echinococci as a mechanical cause of chronic tympanitis in cattle, 176; Interesting cases, 365; Oral sepsis in the dog, 213; Paraphimosis in the dog, 290; Toxic enteritis and constipation in the dog, 212.

Finzi, Guido.—Mercurial compounds in the treatment of epizootic lymphangitis, 223.
Frost, J. N., and Hopper E. B.—Docking and castration of the young lamb, 386.

Gair, G.—Bacterial pyelonephritis in a cow, 56; transmission by cows' milk of B. Diphtheriæ, 44.
Gallagher, Bernard A., and Ward, Archibald R.—Intradermal test for *Bacterium pullorum* infection in fowls, 96.
Galli-Valerio, Professor B.—Coccidia in the intestines—red dysentery of cattle—Observations on *Eimeria zurni-rivolta*, 219.
Gupta, M. C.—Lymphangitis in elephants (illustrated), 405.

"H."—An east coast fever episode, 256.
Hall, Maurice C.—Control of lice on horses, with especial reference to winter conditions, 247, 278; Notes in regard to horse lice, Trichodectes and Hæmatopinus (illustrated), 87.
Hancock, Capt. R. C. G.—Treble strangulation of the ileum in a horse (illustrated), 168.
Hines, Capt. A. J.—Notes on treatment of ulcerative lymphangitis from November 18th, 1917, to January 11th, 1918, 199.
Hobday, Major Frederick—Two interesting cases of "Cherry's operation," 400.
Hodgkins, Lieut.-Col., D.S.O.—Obstructed breathing due to a cyst (illustrated), 399.
Hopper, E. B., and Frost, J. N.—Docking and castration of the young lamb, 386.
Hornby, Capt. H. E.—Normal erythrocyte count of East African native cattle, 243.
Howard, H., D.V.S.—Castration of cryptochid boar, 293.
Hudson, R.—Shoulder lameness treated with injection of cocaine, 150.

Jaegar, John A.—Pitfalls in castration, 302.
Jarvis, Captain E. M.—Report on ixodic lymphangitis, 44.
Jones, Richard.—Spring time cases, 369.

Kaupp, B. F.—Generalised sarcomatosis of the fowl (illustrated), 80.
Kirk, Capt. Hamilton.—Sclerostomes as a cause of debility, 202.

Leiper, R. T.—Is the cat really a definite host of *Dicrocoelium lanceatum*? 327.
Leneveu, Vet. Aide-Major.—Uræmia of acarian origin in horses, 69.
Linton, R. G.—Diatetic value of hayloft sweepings (illustrated), 239.

Lothian, Wm.—Delayed fracture of the humerus, 14; Ectopia cardia (illustrated), 364; Sodium sulphate exsiccat, 247; Wind sucking in a cow, 365.

Mahon, Fred. C.—Aspergillosis of birds, man and animals: a résumé (illustrated), 59; Parasitism: a résumé, 214

Mayall, G.—Alopecia, 16; Bloody urine, 58; Interesting cases, 409; Ptomaine poisoning in the dog, 211; Pyæmia in a heifer, 205; Ringworm in the dog, 291; Sarcoptic mange in dog and purulent ophthalmia in a bull bitch, 178; Seaweed, 401; Treatment of injury of spine in dog by suspension, 175; Tympanitis in dog, 291; Veterinary surgeon as an educative force, 357.

Moore, Major-General J.—Glanders and farcy, 120.

Morgan, Edward.—Braxy: with special reference to the disease as seen in north Cardiganshire, 179, 206; British flock-masters and veterinary surgeons' outlook, 358; Distomatosis, liver-rot, or fluke in sheep and cattle, 5.

Newsom, Col. A. C.—Note on the results of a certain number of operations for laryngeal paralysis on active service, 167; Periodic ophthalmia 157; Ulcerative cellulitis or ulcerative lymphangitis, 130.

Pallin, Major W. A.—Notes on epizootic lymphangitis, 124.

Parker, J. H.—Clinical cases, 411; Lame horse, 330.

Parker, Thomas. — Necessity for abattoirs, 334.

Peatt, Captain E. S. W. Carrel's tube treatment for septic wounds as adapted to veterinary surgery (illustrated), 136.

Pollock, J. W.—Case of digitalis poisoning, 375. Notes on mastitis in cattle, 376.

Powell, C. W.—Diphtheritic vaginitis of cattle, 11.

Price, L.—Horse-flesh as human food, 20.

Rode, Wilhelm.—Horse lazaret, its significance, development and present position, 65.

Rogers, B. R.—New vision of an old plague, 189.

Rouband, M. E.—The production and self-destruction of domestic flies in horse manure, 74.

Routledge, Capt. A. R.—Notes of a case of complete dislocation of the left femur in a cow, with rough diagram showing the characteristic recumbent posture (illustrated), 177.

Savage, Captain A.—Combined neurectomy hook and knife (illustrated), 325.

Taylor, Major J. H.—Actinomycosis, 198.

Velu.—The curative treatment of epizootic lymphangitis by vaccine therapy, 73.

Wadley, Major E. J.—Control and treatment of mange and other contagious skin diseases, 161.

Ward, Archibald R., and Gallagher, Bernard A.—Intradermal test for *Bacterium pullorum* infection in fowls, 87.

Watson, Captain E. A.—Copper sulphate as a disinfectant and a germicide, 326; Some remarks and suggestions on the vaccine and serum methods of treatment of ulcerative lymphangitis, 170.

Way, W. D.—Symptoms and control of stomach-worm disease, 387.

Wilkie, H. C.—Periodic ophthalmia, 244.

Wilson, P.—Case of combined maternal and fœtal dystocia, 329; Retention of urine as a cause of colic in young foals, 333.

Wyssmann, Dr. E.—Double-sided extensive cysts at the frontal end of the wolffian ducts in a cow (illustrated), 186.

GENERAL INDEX.

A.

Abattoirs, necessity for, 334.
Abstracts.—
  Anthrax and its prevention, 347.
  Blood-sucking insects as transmitters of anthrax or charbon, 377
  Cattle-poisoning by water dropwort, 307.
  Composition and value of some of our common vegetables. By D. Crawford, 460.
  Cryptorchidism treated medicinally, 305.
  Delusion that dies hard, 306.
  Docking and castration of the young lamb. By J. N. Frost and E. B. Hopper, 386.
  Gas masks for horses, 387.
  Gastro-intestinal lavage against worms, 304.
  German veterinary casualties to end of 1917, 389.
  New vision of an old plague. By B. R. Rogers, D.V.M., 189.
  Pitfalls in castration. By John A. Jaegar, D.V.M., 302.
  Scabies problem on active service. By Major MacCormac and Capt. Small, 454.
  Seaweed as food for horses, 346.
  Symptoms and control of stomach-worm disease. By W. D. Way, 387.
Actinomycosis, 198.
Adenoma of the kidney in a horse, 55.
Agriculture, meat-inspection service of the United States Department of, 414
Alopecia, 16.
America, France and Italy, the professional "Entente Cordiale" in, 115.
American Army Veterinary Service, 293.
—— —— —— —— in, and the duties of veterinarians during the war period, 318.
—— colleagues, our, and the Somme Veterinary Medical Society, 116.
—— Veterinary Medical Association, code of ethics for members of the, 109.
Amputation of the tail, 254.
Animal food, 42.
—— life, saving, 4.
Animals, birds and man, aspergillosis of. A résumé (illustrated), 59.
——, humane slaughtering of, and the "novices' slaughtering block," 355.
Anthrax, 347, 377.
—— and its prevention, 347.
—— or charbon, blood-sucking insects as transmitters of, 377.
Army Veterinary Service, 269.
—— —— ——, American, 293.
—— —— ——, economic and military necessity of, 263.
Arsenivan in the treatment of epizootic lymphangitis, 72.
Articulation, sacro-iliac, in the mare notes of a case of laceration of the (illustrated), 253.
Asphyxiating gas, effect of on the horse, 301.
Aspergillosis of birds, man and animals. A résumé (illustrated), 59.
Auxiliary Relief Fund Committee, Ladies', 397.
Awkward clients and increased fees, 316.

B

Bacterial pyelonephritis in a cow, 56.
Bacterium pullorum infection in fowls, intradermal test for, 96.
Birds, man and animals, the aspergillosis of. A résumé (illustrated), 59.
Bitch, bull, purulent ophthalmia in a, and sarcoptic mange in dog, 178.
Blood-sucking insects as transmitters of anthrax or charbon, 377.
Bloody urine, 58.
Boar, cryptorchid, castration of, 293.
Bodies, dead, deodorization of, 392.
Boxing competition "somewhere in Italy" (illustrated), 226.
Brain of a dog, epilepsy caused by parasitic cysts in the, 255.
Braxy: with special reference to the disease as seen in north Cardiganshire, 179, 206.
Breathing obstructed, due to a cyst (illustrated), 398.
British and French Army Veterinary Service, conference of officers, 118, 157.
—— flock-masters' and veterinary surgeons' outlook, 358.
Bull bitch, purulent ophthalmia in a, and sarcoptic mange in dog, 178.

C

Calculus, urethral, 111.
Camels, note on jhooling in (illustrated), 17, 18.

Care of horses and mules during the present war, necessity for, 196.
Carrel's tube treatment for septic wounds, as adapted to veterinary surgery (illustrated), 136.
Case of combined maternal and fœtal dystocia, 329.
Case of digitalis poisoning, 375.
—— of laceration of the sacro-iliac articulation in the mare (illustrated), 253.
—— of staggers in horse, 331.
Cases, clinical, 253, 411.
——, interesting, 291, 365, 409.
—— of "Cherry's operation," two interesting, 400.
Castration and docking of the young lamb, 386.
—— of cryptorchid boar, 293.
——, pitfalls in, 302.
Casualties, German veterinary, to end of 1917, 389.
Cat, is it really a definite host of *Dicrocœlium lanceatum?* 327.
Cattle and sheep, distomatosis, liver-rot or fluke in, 5.
——, diphtheritic vaginitis of, 11.
——, hepatic echinococci as a mechanical cause of chronic tympanitis in, 176.
——, native, East Africa, normal erythrocyte count of, 243.
——, notes on mastitis in, 376.
—— poisoning by water drop-wort, 307.
——, red dysentery of—coccidia in the intestines—observations on *Eimeria zurni-rivvlta*, 219.
Cause, mechanical, of chronic tym panitis in cattle, hepatic echinococci as a, 176.
Charbon or anthrax, blood-sucking insects as transmitters of, 377.
"Cherry's operation," two interesting cases of, 401.
Cholera, hog, 107.
Chronic tympanitis in cattle, hepatic echinococci as a mechanical cause of, 176.
Clients, awkward, and increased fees, 316.

Clinical Cases.—
  Castration of cryptorchid boar. By H. Howard, D.V.S., 293.
  Clinical cases, 411.
  —— —— by Henry B. Eve, M.R.C.V.S., 253.
  —— —— By A. Payne, F.R.C.V.S., 451.
  Interesting cases. By J. R. Baxter, M.R.C.V.S., 291.
  Paraphimosis in the dog. By Henry B. Eve, M.R.C.V.S., 290.
  Ringworm in the dog. By G. Mayall, M.R.C.V.S., 291.
  Tympanitis in dog. By G. Mayall, M.R.C.V.S., 291.
Cocaine injection, shoulder lameness treated with, 150.
Coccidia in the intestines—red dysentery of cattle—observations on *Eimeria zurni-rivolta*, 219.
Code of ethics for members of the American Veterinary Medical Association, 109.
Coital exanthema in the horse, 268.
Colic, retention of urine as a cause of, in young foals, 333.
Combined neurectomy hook and knife (illustrated), 325.
Competition, boxing, "somewhere in Italy (illustrated), 226.
Complete dislocation of the left femur in a cow, with rough diagram showing the characteristic recumbent posture (illustrated), 177.
Compounds, mercurial, in the treatment of epizootic lymphangitis, 223.
Conference of Officers of the French and British Army Veterinary Service, 118, 157.
Constipation and toxic enteritis in the dog, 212.
Control and symptoms of stomach-worm disease, 387.
—— of lice on horses, with especial reference to winter conditions, 247, 278.
—— of treatment of mange and other contagious skin diseases, 161.
Copper sulphate as a disinfectant and germicide, 326.
Correspondence.—
  Coital exanthema in the horse, 268.
  Dystocia in the mare, 308.
  Effect of a shell fright, 229.
  Rabies, 391.
  Registered veterinary surgeons, 390.
  Special tribunal, 390.
Count, normal erythrocyte, of East African native cattle, 243
Country, value of the veterinary student to the, 315.
Cow, bacterial pyelonephritis in a, 56.
——, left femur in a, notes of a case of complete dislocation of the, with rough diagram showing the characteristic recumbent posture (illustrated), 177.
——, milk defects in the, and their remedies, 246.
——, radial paralysis in the (illustrated), 15.
——, wind sucking in a, 365.
Cryptorchid boar, castration of, 293.
Cryptorchidism treated medicinally, 305.

Curative treatment of epizootic lymphangitis by vaccine therapy, 73.
Cyst, obstructed breathing due to (illustrated), 398.
Cysts, parasitic, in the brain of a dog, epilepsy caused by, 255.

D

Dead bodies, deodorization of, 392.
Debility, sclerostomes as a cause of, 202.
Defects, milk, in the cow and their remedies, 246.
Delayed fracture of the humerus, 14.
Delusion that dies hard, 306.
Deodorization of dead bodies, 392.
Department of Agriculture, meat-inspection service of United States, 414.
Daignosis and therapeutics of glanders, 298.
—— and treatment, few errors in, 371.
Dicrocœlium lanceatum, is the cat really a definite host of, 327.
Dietetic value of hay-loft sweepings (illustrated), 237, 239.
Digitalis poisoning, case of, 375.
Diphtheritic vaginitis of cattle, 11
Diseases of fowls and fish, 77.
——, seasonal, of war, 195.
Disinfectant and germicide, copper sulphate as a, 327.
Dislocation, complete, of the left femur in a cow, notes of a case of, with rough diagram showing the characteristic recumbent posture (illustrated), 177.
Distomatosis, liver-rot, or fluke in sheep and cattle, 5.
Docking and castration of the young lamb, 386.
Dog, epilepsy caused by parasitic cysts in the brain of, 255.
——, intussusception in the, 86.
——, oral sepsis in the, 213
——, paraphimosis in the, 290.
——, ptomaine poisoning in the, 211.
——, ringworm in the, 291.
——, sarcoptic mange in the, and purulent ophthalmia in a bull bitch, 178.
——, toxic enteritis and constipation in the, 213.
——, treatment of injury of the spine in, by suspension, 175.
——, tympanitis in, 291.
Double-sided extensive cysts at the frontal end of the wolffian ducts in a cow (illustrated) 186.
Duties of veterinarians during the war period, and veterinary service in the American Army, 318.
Dysentery, red, of cattle—coccidia in the intestines—observations on *Eimeria zurni-rivolta*, 219.
Dystocia, fœtal and maternal combined, case of, 329.
—— in the mare, 308.

E.

East African native cattle, normal erythrocyte count of, 243.
—— coast fever episode, 256.
Echinococci, hepatic, as a mechanical cause of chronic tympanitis in cattle, 176.
Economic and military necessity of an Army Veterinary Service. By Col. J. J. Aitken, 263.
Economy, necessity for, in regard to horses and mules, 316.
Ectopia cardis (illustrated), 364.
Educative force, veterinary surgeon as an, 357.
Effect of a shell fright, 229.
Effects of asphyxiating gas on the horse, 301.
Effort to return the American Veterinary Service to the Quartermaster Corps of the army, 297.
Eimeria zurni-rivolta, observations on —coccidia in the intestines—red dysentery of cattle, 219.
Elephants, lymphangitis in (illustrated), 403.
Energy and production, 3.
"Entente Cordiale," professional, in France, Italy and America, 115.
Enteritis, toxic, and constipation in the dog, 212.
Epilepsy caused by parasitic cysts in the brain of a dog, 255.
Epizootic lymphangitis, arsenivan in the treatment of, 72.
—— ——, curative treatment of, by vaccine therapy, 72.
—— ——, notes on, 124.
—— ——, mercurial compounds in the treatment of, 223.
Equine specific ophthalmia, notes on the treatment of, 54.
Errors in diagnosis and treatment, 371.
Erythrocyte count, normal, of East African native cattle, 243.
Ethics, code of, for members of the American Veterinary Medical Association, 109.
Exanthema, coital, in the horse, 268.

F

Fees, increased, and awkward clients, 316.

Femur, left, in a cow, notes of a case of complete dislocation of, with rough diagram showing characteristic recumbent posture (illustrated), 177.

Fever episode, an east coast, 256.

Few errors in diagnosis and treatment, 371.

Fish and fowl, diseases of, 77.

Fishing, new mode of, 108.

Flies, domestic, in horse manure, the production and self-destruction of, 74.

Flock-masters' (British) and veterinary surgeons' outlook, 358.

Fluke, distomatosis, or liver-rot in sheep and cattle, 5.

Foals, young, retention of urine as a cause of colic in, 333.

Fœtal and maternal dystocia combined, case of, 329.

Food, animal, 42.

—— ration scheme, inclusion of horseflesh in the, 155.

Fowl and fish, diseases of, 77.

——, generalised sarcomatosis of the (illustrated), 80.

Fowls, intradermal test for *Bacterium pullorum* infection in, 86.

Fracture, delayed, of the humerus, 4.

France, Italy and America, professiomal "Entente Cordiale" in, 115.

French and British Army Veterinary Service, conference of officers, 118, 157.

Fruit and vegetables, and their relation to the spread of infectious diseases, 344.

G

Gas, asphyxiating, effects on the horse, 301.

—— masks for horses, 387.

Gastro-intestinal lavage against worms, 304.

General Articles.—

American Army Veterinry Service, 293.

East Coast fever episode, an. By "H," 256.

Effort to return the American Veterinary Service to the Quartermaster Corps of the army, 297.

Horse flesh as human food. By L. Price, 20.

Meat inspection service of the United States Department of Agriculture. By George Ditewig, 414.

Necessity for abattoirs. By Thomas Parker, F.R.C.V.S., 334.

Generalised sarcomatosis of the fowl (illustrated), 80.

German veterinary casualties to end of 1917, 389.

Germicide and disinfectant, copper sulphate as a, 326.

Glanders, 120, 298.

—— and farcy, 120.

——, diagnosis and therapeutics of, 298.

H

Hæmatopinus, horse lice and *Trichodectes*, notes in regard to (illustrated), 87.

Hay-loft sweepings, dietetic value of (illustrated), 237, 239.

Heifer, pyæmia in a, 205.

Hepatic echinococci as a mechanical cause of chronic tympanitis in cattle, 176.

Hog cholera, 107.

Hook, neurectomy, and knife combined (illustrated), 325.

Horse, adenoma of the kidney in a, 55.

——, case of staggers in, 331.

——, coital exanthema in the, 268.

——, effects of asphyxiating gas on the, 301.

——, lame, 330.

—— lazaret, its significance, development and present position, 65.

—— lice, *Trichodectes* and *Hæmatopinus*, notes in regard to (illustrated), 87.

——, treatment of lymphangitis in the, 111.

——, treble strangulation of the ileum in a (illustrated), 168.

Horseflesh as human food, 20.

——, inclusion of, in the food ration scheme, 155.

Horses and mules, necessity for economy in regard to, 316.

—— ——, —— for the proper care of, during the present war, 196.

Horses, control of lice on, with especial reference to winter conditions, 247, 278.

——, gas masks for, 387.

——, uræmia of acarian origin in, 69.

Human food, horseflesh as, 20.

Humerus, delayed fracture of, 14.

I

Illustrations.—

Aneurism post aorta in the mare, 254.

Campbell, the late Capt. A. W., 2.

Carrel's tube treatment for septic wounds as adapted to veterinary surgery, 137, 139, 143.

Conidiospore, conidia, acospore and aspergilli, 63.

Cow, uterus of a, with double-sided extensive cysts, 187.
Dietetic value of hay-loft sweepings (illustrated), 239.
Dislocation of the femur (left) in cow, characteristic recumbent posture in, 178.
Ectopia cardis, 364.
Fray, Vétérinaire Inspecteur, 194.
Generalised sarcomatosis of the fowl, 81, 82, 83, 84, 85.
Group of competitors in an international boxing contest "somewhere in Italy," 226.
Hammond, the late John, M.R.C.V.S., 234.
Hay-loft sweepings, 240, 242.
Horse lice, 88.
Ileum, treble strangulation of the, in a horse, 169.
Jhooling in camels, 17, 18.
Leach, the late Capt. R. E., 2.
Lennox-Conyngham, Lieut.-Col. H. M., D.S.O., M.R.C.V.S., 154.
Liautard, the late Alexandre Francois, 234.
Mackenzie, Captain W. J. E., A.V.C., 274.
Neurectomy hook and knife combined, 325.
Obstructed breathing due to a cyst, 399.
Radial paralysis in cow, 15.
Routledge, Captain A. R., F.R.C.V.S., 314.
Shirley, the late Capt. James. W., 2.
Smith, Henry, M.R.C.V.S., 314.
Todd, the late Mr. J. A., M.R.C.V.S., 40.
Willett, Jack, M.R.C.V.S., 394.
Wright, the late Mr. T., M.R.C.V.S., 40.

Inclusion of horseflesh in the food ration scheme, 155.
Injury of the spine in the dog treated by suspension, 175.
Insects, blood-sucking, as transmitters of anthrax or charbon, 377.
Interesting cases, 291, 365, 400.
—— —— (two) of "Cherry's operation," 400.
"Intesa Amichévole" and our Italian colleagues, 117.
Intestines, coccidia in the—red dysentery of cattle—observations on *Eimeria zurni-rivolta*, 219.
Intradermal test for *Bacterium pullorum* infection in fowls, 96.
Intussusception in the dog, 86.
Is the cat really a definite host of *Dicrocœlium lanceatum?* 327.
Italian colleagues and "Intesa Amichévole," 117.
Italy, America and France, the professional "Entente Cordiale" in, 115.
——, somewhere in, boxing competition (illustrated), 226.
Ixodic lymphangitis, report on, 44.

J.

Jhooling in camels, note on (illustrated), 17, 18.

K.

Kidney, adenoma of the, in a horse, 55.
Knife and neurectomy hook combined (illustrated), 325.

L.

Laceration, of the sacro-iliac articulation in the mare, notes of a case of (illustrated), 253.
Ladies' Auxiliary Veterinary Relief Fund, 238, 397.
Lamb, young, docking and castration of, 386.
Lame horse, 330.
Lameness, shoulder, treated with injection of cocaine, 150.
Laryngeal paralysis on active service, notes on the results of a certain number of operations for, 167.
Lavage, gastro-intestinal against worms, 304.

Leading Articles.—
American colleagues, our, and the Somme Veterinary Medical Society, 116.
Animal food, 42.
Awkward clients and increased fees, 316.
Dietetic value of hay-loft sweepings (illustrated), 237.
Diseases of fowls and fish, 77.
Energy and production, 3.
Inclusion of horseflesh in the food ration scheme, 155.
Is the practice of medicine more an art than a science? 235.
Italian colleagues, our, and "Intesa Amichévole," 117.
Ladies' Auxiliary Veterinary Relief Fund, 238.
Milk, 78.
Necessity for economy in regard to horses and mules, 316.
——for the proper care of horses and mules during the present war, 196.

"Novices' slaughtering block," and the humane slaughtering of animals, 355.
Our Ladies' Auxiliary Relief Fund Committee, 395.
—— livelihood, 41.
Professional "Entente Cordiale" in France, Italy and America, 115.
Research work, 275.
Saving animal life, 4.
Self-help, 395.
Some seasonal diseases of war, 195.
Text-books, 276.
Veterinary student, and his value to the country, 315.
—— —— and the continuation of the war, 156.
—— tribunal, 356.
What's over yonder? 353.
Lice, control of, on horses, with especial reference to winter conditions, 247, 278.
——, horse, *Trichodectes* and *Hæmatopinus*, notes in regard to (illustrated), 87.
Livelihood, our, 41.
Liver-rot or fluke (distomatosis), in sheep and cattle, 5.
Lymphangitis, epizootic, arsenivan in the treatment of, 72.
—— ——, curative treatment of, by vaccine therapy, 73.
—— ——, notes on, 124.
—— in elephants (illustrated), 403.
—— in the horse, treatment of, 111.
—— ixodic, report on, 44.
——, ulcerative, notes on treatment from November 18th, 1917, to January 11th, 1918, 199.
—— ——, or ulcerative cellulitis, 130.
—— ——, remarks and suggestions on the vaccine and serum methods of treatment of, 170.

M

Mal-de-caderas, 266.
Man, birds and animals, aspergillosis of. A résumé (illustrated), 59.
Mange, sarcoptic, in the dog, and purulent ophthalmia in a bull bitch, 178.
Manure, horse, the production and self-destruction of domestic flies in, 74.
Mare, notes of a case of laceration of the sacro-iliac articulation in the (illustrated), 253.
Mastitis in cattle, notes on, 376.
Maternal and fœtal dystocia combined, case of, 329.
Meat-inspection Service of the United States Department of Agriculture, 414.
Medicine, is the practice of, more an art than a science? 235.
Medicinal treatment of cryptorchidism, 305.
Mercurial compounds in the treatment of epizootic lymphangitis, 223.
Military and economic necessity of an Army Veterinary Service, 263.
Milk, 78.
—— defects in the cow and their remedies, 246.
Milk-borne diseases, 433.
Mode, new, of fishing, 108.
Mules and horses, necessity for economy in regard to, 316.
—— —— —— for the proper care of, during the present war, 196.

N

Native cattle of East Africa, normal erythrocyte count of, 243.
Necessity for abattoirs, 334, 432.
—— for economy in regard to horses and mules, 316.
—— for the proper care of horses and mules during the present war, 196.
Necro-Bacillosis, 434.
Neurectomy hook and knife combined (illustrated), 325.
New mode of fishing, 108.
—— order in Italy regarding horses, mules or donkeys sent to the abattoirs, 351.
—— vision of an old plague, 189.
—— Year's honours, 35.
Normal erythrocyte count of East African native cattle, 243.
North Cardiganshire, special reference to the disease, braxy, as seen in, 206.
Note on jhooling in camels (illustrated), 17, 18.
Notes in regard to horse lice, *Trichodectes* and *Hæmatopinus* (illustrated, 87.)
—— of a case of laceration of the sacro-iliac articulation in the mare (illustrated), 253.
—— on mastitis in cattle, 376.
—— on treatment of ulcerative lymphangitis from November 18th, 1917, to January 11th, 1918, 199.
Notice.—
Stannoxyl, 190.
"Novices' slaughtering block," and the humane slaughtering of animals, 355.

O

Obituary.—
Baldassare, Salvatore, 37.
Campbell, the late Capt. A. W (illustrated), 2 and 36.
Carr Bey, 37.
Gibbings, F. H., F.R C.V.S. (illustrated), 348.
Hammond, Mr. John, M.R.C.V.S., 229.
Leach, the late Captain R. E. (illustrated), 2 and 36.
Lenox Conyngham, Lt.-Col. H. M (illustrated), 192.
Liautard, Alexandre Francois, M.D. D.V.M., 231, 270.
Melvin, Dr. Alonzo Dorus, 232.
Routledge, Captain A. R., M.R.C.V.S., 309.
Shirley, Captain J., A.V.C., 2, 36.
Smith, Henry, M.R.C.V.S., 309,
Stephenson, Dr. Clement, 349.
Todd, J. A. (illustrated), 40, 76.
Wan Emms, 38.
Wright, Thomas, M.R.C.V.S. (illus. trated), 40, 75.
Observations on *Eimeria zurni-rivolta* —Coccidia in the intestines—Red dysentery of cattle, 219.
Obstructed breathing due to a cyst (illustrated), 398.
Officers' Conference of the French and British Army Veterinary Service, 118, 157.
Operations for laryngeal paralysis on active service, note on the results of a certain number of, 167.
Ophthalmia, equine specific, notes on the treatment of, 54.
——, periodic, 244.
——, purulent, in a bull bitch, and sarcoptic mange in dog, 178.
Oral sepsis in the dog, 213.
Origin, uræmia of acarian, in horses, 69

Original Communications;—
About Hæmatozoa and their intermediary carriers or bearers, By Thomas B. Goodall, F.R.C.V.S. 437.
Actinomycosis. By Major J. H. Taylor, M.C., 198.
Adenoma of the kidney in a horse. By Lieut. J. J. Aveston, M.R.C.V.S., A.V.C., 55.
Alopecia. By G. Mayall, M.R.C.V.S., 16.
Aspergillosis of birds, man and animals. A résumé (illustrated) By Fred C. Mahon, M.R.C.V.S., 59.
Bacterial pyelonephritis in a cow. By G. Gair, M.R.C.V.S., 56.
Bloody urine. C. Mayal,l M.R.C.V.S., 58.
Braxy: with special reference to the disease as seen in North Cardiganshire. By E. Morgan, M.R.C.V.S., D.V.N., 179, 206.
British flock-masters' and veterinary surgeons' outlook. By E. Morgan, M.R.C.V.S., D.V.H., 358.
Carrel's tube treatment for septic wounds, as adapted to veterinary surgery. By Capt. E. S. W. Peatt, (illustrated), 136.
Case of combined maternal and fœtal dystocia. By P. Wilson, M.R.C.V.S., 329.
—— of digitalis poisoning. By J. W. Pollock, M.R.C.V.S., 375.
—— of staggers in horse. By M. Clarkson, M.R.C.V.S., 331.
Clinical cases. By J. H. Parker, M.R.C.V.S., 411.
Code of ethics for members of the American Veterinary Medical Association, 109.
Combined neurectomy hook and knife (illustrated). By Capt. A. Savage, 325.
Conference of officers of the French and British Army Veterinary Service, held in France, January 12th, 1918, 118, 157.
Control of lice on horses, with especial reference to winter conditions. By Maurice C. Hall, Ph.D., D.V.M., 247, 278.
Copper Sulphate as a disinfectant and germicide. By Capt. Watson, A.V.C., 326.
Delayed fracture of the humerus By Wm. Lothian, M.R.C.V.S., 14.
Dietetic value of hay-loft sweepings (illustrated). By R. G. Linton, M.R.C.V.S., 239.
Diphtheritic vaginitis of cattle. By C. A. Powell, M.R.C.V.S., 11.
Distomatosis, liver-rot, or fluke in sheep and cattle. By Edward Morgan, M.R.C.V.S., D.V.H., 5.
Ectopia cardis (illustrated). By W. Lothian, M.R.C.V.S., 364.
Few errors in diagnosis and treatment. By "Canis Major," 371
Gangrenous Dermatitis, 435.
Generalised sarcomatosis of the fowl (illustrated). By B. F. Kaupp, 80.
Glanders and farcy. By Major-General J. Moore, C.B., F.R.C.V.S. 120.
Hepatic echinococci as a mechanical cause of chronic tympanitis in cattle. By Henry B. Eve, M.R.C.V.S., 176.

Hog cholera, 107.
Interesting case. By Henry Eve, M.R.C.V.S., 365.
——. By G. Mayall, M.R.C.V.S. 409.
Intradermal test for *Bacterium pullorum* infection in fowls. By Archibald R. Ward and Bernard A. Gallaghar, 96.
Intussusception in the dog, 86.
Is the cat really a definite host of *Dicrocœlium lanceatum?* By R. T. Leiper, M.D., D.Sc., 327.
Lame horse. By J. H. Parker, M.R.C.V.S., 330.
Lymphangitis in elephants. By M. C. Gupta (illustrated), 403.
Milk defects in the cow and their remedies. By G. Mayall, M.R.C.V.S., 246.
New mode of fishing, 108.
Normal erythrocyte count of East African native cattle. By Capt. H. E. Hornby, 243.
Note on jhooling in camels. By H. E. Cross, M.R.C.V.S., D.V.H., D.Sc. (illustrated), 17, 18.
—— on the results of a certain number of operations for laryngal paralysis on active service. By Col. Newsom, C.M.G., D.D.V.S. 167.
Notes in regard to horse lice, *Trichodectes* and *Hæmatopinus* (illustrated). By Maurice C. Hall, Ph.D., D.V.M., 87.
—— of a case of complete dislocation of the left femur in a cow, with rough diagram showing the characteristic recumbent posture. By Capt. W. R. Routledge, F.R.C.V.S. (illustrated), 177.
—— on epizootic lymphangitis. By Major W. A. Pallin, D.S.O., F.R.C.V.S., 124.
—— on mastitis in cattle. By J. W. Pollock, M.R.C.V.S., 376.
—— on treatment of equine specific ophthalmia. By Major F. Chambers, F.R.C.V.S., A.V.C., 54.
—— —— of ulcerative lymphangitis, from November 18th, 1917, to January 11th, 1918. By Capt. A. J. Hines, A.V.C. (T.F.), 199.
Obstructed breathing due to a cyst. By Lieut.-Col. J. R. Hodgkins, D.S.O. (illustrated), 398.
Oral sepsis in the dog. By Henry B. Eve, M.R.C.V.S., 213.
Parasitism. A résumé. By Fred. C. Mahon, M.R.C.V.S., 214
Periodic ophthalmia. By H. C. Wilkie, F.R.C.V.S., F.Z.S., 244.
Ptomaine poisoning in the dog. By G. Mayall, M.R.C.V.S., 211.
Purpura hæmorrhagica. By W. W. Brooke, M.R.C.V.S., 373.
Pyæmia in a heifer. By G. Mayall, M.R.C.S., 205.
Radial paralysis in the cow (illustrated), 15.
Report on ixodic lymphangitis. By Capt. E. M. Jarvis, S.A.V.C., 44.
Retention of urine as a cause of colic in young foals. By P. Wilson, M.R.C.V.S., 333.
Sarcoptic mange in the dog, and purulent ophthalmia in a bull bitch. By G. Mayall, M.R.C.V.S., 178.
Sclerostomes as a cause of debility. By Capt. Hamilton Kirk, A.V.C.T.F., 202.
Seaweed. By G. Mayall, M.R.C.V.S., 481.
Shoulder lameness treated with injection of cocaine. By R. Hudson, M.R.C.V.S., 150.
Sodium sulphate exsiccat. By W. Lothian, M.R.C.V.S., 247.
Some remarks and suggestions on the vaccine and serum methods of treatment of ulcerative lymphangitis (lymphangitis ulcereuse-Nocard). By Capt. E. A. Watson, C.A.V.C., 170.
Springtime cases. By Richard Jones, M.R.C.V.S., 369.
Tannin and tanning. By P. G. Pond, M.R.C.V.S., 284.
Toxic enteritis and constipation in the dog. By Henry B. Eve, M.R.C.V.S., 212.
Transmission by cow's milk of B. Diphtheria. By G. Gair, M.R.C.V.S, 447.
Treatment of injury of the spine in the dog by suspension. By G. Mayall, M.R.C.V.S., 175.
Treble strangulation of the ileum in a horse. By Capt. R. C. G. Hancock (illustrated), 168.
Two interesting cases of "Cherry's operation." By Major Frederick Hobday, F.R.C.V.S., 400.
Ulcerative cellulitis or ulcerative lymphangitis. By Colonel A. C. Newsom, C.M.G., D.D.V.S., 130.
Urethral calculus, 110.
Veterinary service in the American Army, and the duties of veterinarians during the war period. By Major Charles E. Cotton, V.C., N.A., 318.

—— surgeon as an educative force. By G. Mayall, M.R.C.V.S., 357.
Wind sucking in a cow. By W. Lothian, M.R.C.V.S., 365.
Our Ladies' Auxiliary Relief Fund Committee, 397.

P.

Paralysis, radial, in the cow (illustrated), 15.
Paraphimosis in the dog, 290.
Parasitic cysts in the brain of a dog, epilepsy caused by, 255.
Parasitism. A résumé, 214.
Periodic ophthalmia, 157, 244.
New Year's honours, 35, 229, 309, 392, 431, 432.
Pitfalls in castration, 302.
Poisoning, ptomaine, in the dog, 211.
Practice of medicine, is the, more an art than a science? 235.
Production and self-destruction of domestic flies in horse manure, 74.
——, energy and, 3.
Professional "Entente Cordiale" in France, Italy, and America, 115.
Ptomaine posioning in the dog, 211.
Purpura hæmorrhagica, 373.
Purulent ophthalmia in a bull bitch and sarcoptic mange in dog, 17.
Pyæmia in a heifer, 205.
Pyelonephritis, bacterial, in a cow, 56.

Q

Quartermaster Corps of the army, effort to return the American Veterinary Service to the, 297.

R

Rabies, 391.
Radial paralysis in the cow (illustrated), 15.
Red dysentery of cattle—coccidia in the intestines—observations on *Eimeria zurni-rivolta*, 219.
Registered veterinary surgeons, 390.
Remedies for milk defects in the cow, 246.
Report on ulcerative cellulitis—ulcerous lymphangitis. By Capt. A.E. Watson, A.V.C., 271.
Research work, 275.
Results of a certain number of operations for laryngeal paralysis on active service, 167.
Retention of urine as a cause of colic in young foals, 333.
Reviews.—
Annual Report of the Civil Veterinary Department, Bihar and Orissa, for the year 1917–1918. 429.
Annual Report on the Allahabad Civil Veterinary Department, for the year ending 31st March, 1917, 352.
Common diseases of pigs and their diagnosis, including swine fever and its treatment with serum (Peacey–Baillière), 430.
Meat inspection problems, with special reference to the developments of recent years (Howarth—Baillière), 113.
"Notes on parasitic anaphylaxis and allergy" (L. Van Ess and A. F. Schalk), 190.
Practical veterinary pharmacology and therapeutics (Milks—Macmillan), 152.
Report of the twenty-first annual meeting of the United States Live Stock Sanitary Association, Chicago, December 3, 4, 5, 1917, 228.
Report of the Veterinary Director-General for the Department of Agriculture, Canada, 1916 (Labroquerie Taché), 31.
Rhodesia Agricultural Journal, 191.
Special Equine Therapy (Steffan—American Veterinary Publishing Co.), 33.
Text-book of the principles and practice of Veterinary Medicine (White—Lea & Febiger), 312.
Veterinary Obstetrics. By W. L. Williams, 34.
Veterinary post-mortem technique (Crocker—Lippincott), 272, 351.
Veterinary review, February, 1918 (Bradley—Green), 114.
Veterinary Surgical Operations (Mèrillat—Ballière), 310.
Wounds of animals and their treatment (Smythe—Ballière), 227.
Ringworm in the dog, 291.

S

Sacro-iliac articulation in the mare, notes of a case of laceration of the (illustrated), 253.
Sarcomatosis, generalised, of the fowl (illustrated), 80.
Sarcoptic mange in the dog, and purulent ophthalmia in a bull bitch, 178.
Saving animal life, 4.
Science, is the practice of medicine more an art than a? 235.
Sclerostomes as a cause of debility, 202.
Seasonal diseases of war, 195.
Seaweed, 401.

Self-destruction and production of domestic flies in horse manure, 74.
Self-help, 395.
Sepsis, oral, in the dog, 213.
Septic wounds, Carrel's tube treatment for, as adapted to veterinary surgery (illustrated), 136.
Serum and vaccine methods of treatment of ulcerative lymphangitis, some remarks and suggestions, 170.
Service, veterinary, in the American Army, and the duties of veterinarians during the war period, 318.
Sheep and cattle, distomatosis, liver-rot or fluke in, 5.
Shell fright, effect of a, 229.
Shoulder lameness treated with injection of cocaine, 150.
Slaughtering, humane, of animals, and the "novices' slaughtering block," 355.
Sodium sulphate exsiccat, 247
Some seasonal diseases of war, 195.
"Somewhere in Italy," boxing competition (illustrated), 226.
Somme Veterinary Medical Society, and our American colleagues, 116.
Special tribunal, 390.
Specific ophthalmia, equine, notes on the treatment of, 54.
Spine in dog, treatment of injury of, by suspension, 175.
Spring time cases, 369.
Staggers, case of, in horse, 331,
Stomach-worm disease, symptoms and control of, 387.
Strangulation, treble, of the ileum in a horse, 168.
Student, veterinary, and his value to the country, 315.
—— ——, and the continuation of the war, 156.
Surgeon, veterinary, as an educative force, 357.
Suspension, treatment of injury of the spine in the dog by, 175.
Sweepings, hay-loft, dietetic value of (illustrated), 237, 239.
Symptoms and control of stomach-worm disease, 387.

T.

Tail, amputation of, 254.
Tannin and tanning, 284.
Test, intradermal, for *Bacterium pullorum* infection in fowls, 96.
Text-books, 276.
Therapeutics, diagnosis and, of glanders, 298.
Therapy, vaccine, the curative treatment of epizootic lymphangitis by, 73.
Toxic enteritis and constipation in the dog, 212.
Translations.—
  Arsenivan in the treatment of epizootic lymphangitis, 73.
  Coccidia in the intestines—red dysentery of cattle—Observations on *Eimeria zurni-rivolta* By Prof. B. Galli-Valerio, 219.
  Curative treatment of epizootic lymphangitis by vaccine therapy. By Velu, 73.
  Diagnosis and therapeutics of glanders, 298.
  Double-sided extensive cysts at the frontal end of the wolffian ducts in a cow. By Dr. E. Wyssmann (illustrated), 186.
  Effects of asphyxiating gas on the horse, 301.
  Fruit and vegetables, and their relation to the spread of infectious diseases. By K. V. Russ, 344.
  Horse lazaret, its significance, development and present position. By Wilhelm Rode, 65.
  Mal-de-caderas, 266.
  Mercurial compounds in the treatment of epizootic lymphangitis. By Prof. Guido Finzi, 223.
  On the treatment of lymphangitis in the horse. By Vet. Major Chaussé, 111.
  Production and self-destruction of domestic flies in horse manure. By M. E. Rouband, 74.
  Two new feeding-stuffs, 188.
  Uræmia of acarian origin in horses. By Vet. Aide-Major Leneven, 69.
Transmitters of anthrax or charbon, blood-sucking insects as, 377.
Treatment and diagnosis, few errors in, 371.
—— of epizootic lymphangitis, mercurial compounds in the, 223.
—— of equine specific ophthalmia, notes on, 54.
—— of injury of the spine in the dog by suspension, 175.
—— of ulcerative lymphangitis by vaccine and serum, 170.
—— —— —— from November 18th, 1917, to January 11th, 1918, 199.
Treble strangulation of the ileum in a horse (illustrated), 168.
Trichodectes, *Hæmatipous*, and horse lice, notes in regard to (illustrated), 87.
Tube treatment, Carrel's, for septic wounds, as adapted to veterinary surgery (illustrated), 136.
Two interesting cases of "Cherry's operation," 400.

—— new feeding-stuffs, 188.
Tympanitis, chronic, in cattle, hepatic echinococci as a mechanical cause of, 176.
—— in dog, 291.

U.

Ulcerative cellulitis or ulcerative lymphangitis, 130.
—— lymphangitis, notes on treatment of, from November 18th, 1917, to January 11th, 1918, 199.
—— ——, some remarks and suggestions on the vaccine and serum treatment of, 170.
United States Department of Agriculture, meat-inspection service, 414.
Uræmia of acarian origin in horses, 69.
Urethal calculus, 110.
Urine, bloody, 59.
——, retention of, as a cause of colic in young foals, 333.

V.

Vaccine and serum methods of treatment of ulcerative lymphangitis, some remarks and suggestions on, 170.
——, therapy, curative treatment of epizootic lymphangitis by, 73.
Vaginitis of cattle, diphtheritic, 11.
Value, dietetic, of hay-loft sweepings (illustrated), 237, 239.
—— of the veterinary student to the country, 315.
Veterinarians, duties of, during the war period, and veterinary service in the American Army, 318.
Veterinary casualties, German, to end of 1917, 389.
—— Service, American, an effort to return to the Quartermaster Corps of the Army, 297.
—— —— in the American Army, and the duties of veterinarians during the war period, 318.
—— student, and his value to the country, 315.
—— —— and the continuation of the war, 156.
—— surgeon as an educative force, 357.
—— surgeons' and British flock-masters' outlook, 258.
—— tribunal, 356.

W.

War, continuation of the, and the veterinary student, 156.
——, some seasonal diseases of, 195.
——, the present, necessity for the proper care of horses and mules during, 196.
Water drop-wort, cattle-poisoning by, 307.
What's over yonder ? 353.
Wind sucking in a cow, 365.
Winter conditions, control of lice on horses, with especial reference to, 247.
Worms, gastro-intestinal lavage against, 304.

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